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THE BASIN OF LAKE TITICACA.

BY

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In the heart of the western part of South America, between the 16th and 17th degrees of south latitude and the 68th and 70th of longitude west of Greenwich, lies the extensive water-sheet of Lake Titicaca, at an altitude of 12,466 feet above the level of the Pacific. By air-line it is about 300 miles from the western, and at least 2,000 miles from the Atlantic, shore. Peru claims two-thirds of its surface, and Bolivia the southeastern third; but, as yet, the boundary-line is rather indefinite.

Approach to the lake from the west and southwest is quite abrupt as far as Arequipa, where the peaks of the slumbering volcano Misti (19,250 feet), and its northern companion Charchani (20,300), rise like towering monuments. They are, for some distance, the most southerly pillars (Pichu-Pichu, about 18,000 feet high, forming but an elongated crest) of the Peruvian coast Cordillera. North of Arequipa a number of summits, part of which are mentioned in dim Indian tradition as formerly active volcanoes, rise to still greater elevations, like the Koro-Puna, the altitude of which is said to exceed 23,000 feet, which would make it the highest mountain on the American continent, so far as known. Crossing, between Misti and Charchani, a wild labyrinth of volcanic débris, a high table-land is reached, on which the railroad has to climb to 14,660 feet at the station of Cruces, near Vincocaya. This plateau is cold, bleak, and correspondingly dismal. The vicuña still roams over it in small flocks, and human abodes are few and far between. From near the culminating point the column of smoke issuing from the crater of the volcano of Ubinas rises on the southern horizon,

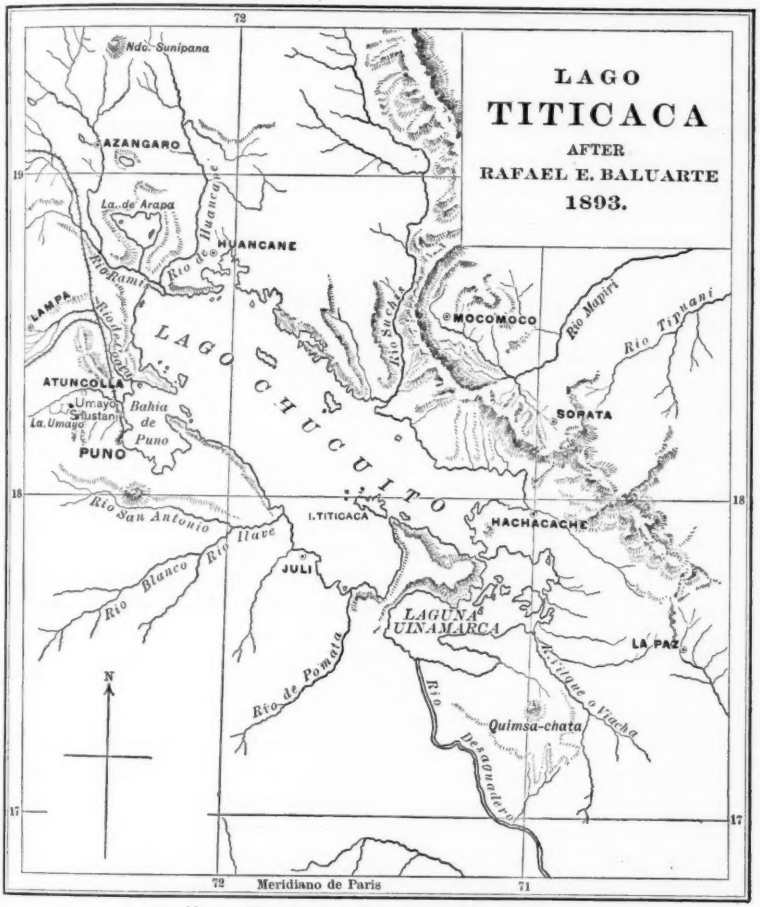
and the dark mass of Omate, the top of which was blown to atoms during the terrible eruption of 1600 (like that of Coseguina in Central America, and Mont Pelé in Martinique), rises up in the neighbourhood of Ubinas with its four prongs, indicating the ruins of its crater.

Descent to Lake Titicaca is gradual. The beautiful lagoons of Saracocha and Parinacocha, picturesque, but with very bleak shores, nestle at the base of the snow-clad range of Lampa; then a deep furrow is entered that has some arborescent vegetation, and a number of Indian settlements, haciendas, and the mining establishment of Maravillas. This furrow leads to the marshy shores of the Rio Ramis at Juliaca, a village, the site of which was occupied by an Indian settlement at the time of the Conquest. The region now reached belonged to what in primitive times was termed the Collao, and held by Indians of Aymará stock. Since then the Quichua have, under Spanish rule, slowly encroached, and they occupy the territory as far as the northern half of the town of Puno.

Lake Titicaca is reached by the railroad near the former principal settlements of the Aymará, Paucar-Colla, and Hatun-Colla, now reduced to insignificant hamlets. Neither were they ever very populous. The idea of a former large population belongs to romance. Statistics prove that the present Indian population of these regions has not diminished; and the evidence adduced in favour of a supposed dense primitive settlement of the land, based upon the countless artificial terraces that streak nearly every slope, is by no means conclusive. The extent of levels is small, and, where they lie along streams and are therefore susceptible of irrigation, they are also exposed to overflow; and a large portion of them is occupied by marshes, which, along the Ramis, are often alkaline. For this reason the Indian had to cultivate the slopes in preference, converting them into narrow terraced garden-beds. This system obtains to-day, and many of the andenes (as the Quichuas call them) are *modern*. Furthermore, the Indian had no fertilizers; neither will he use manure to-day, but prefers to let the soil restore its productiveness through rest. That rest lasts, according to local conditions, from one to ten and more years, so that only a limited extent of the numberless artificial terraces was tilled at the same time, and these are, consequently, no criterion as to former numbers of the people.

Already from the heights overlooking the track along the lakeshore a glimpse is obtained of the magnificent chain of snowy

peaks extending along the eastern side of Lake Titicaca from southeastern Peru into central Bolivia, and known, in its Bolivian portion, as the Andes of Bolivia, or Cordillera Real. Along the base of these magnificent Alps of South America, conspicuous through the strong individualization of each mountain and the



NOTE.—*Chucuito* is an older name of Lake Titicaca.

abundance of characteristic glaciers, Lake Titicaca extends from northwest to southeast like a trough, abrupt and very deep along the northeastern, and gently sloping from the western, shore, as far as the main body of the lake extends.

Puno existed, as an Indian village, certainly in 1548; hence, it is likely that the site was occupied already before the Conquest. It now has about 5,500 inhabitants, the majority of whom are mixed with Indian blood. The Spanish settlement was officially recognized as such in 1668 or 1669. It is the Peruvian port for the navigation of the lake to the Bolivian shores.

Lake Titicaca fills a trough about 120 miles long, at the southwestern base of the Bolivian Andes. It consists of the main lake, 41 miles wide at its greatest expansion, and several large bays, like the lagoon of Chucuito, on which Puno is located, the most northern bay in front of Taraco and Vilque on Peruvian territory, and the extreme southeastern lagoons of Chililaya and Uinamarca. While in the main lake accurate determinations of depths on the west give no figures much in excess of 609 feet, on the eastern or Bolivian side we find 828 and 841 feet. Near the little island of Koa 1,312 feet are recorded. It is certain that about the Island of Titicaca, the promontory of Copacavana, and as far as the mouth of the straits of Tiquina, the lake is very deep; but in these straits, by which the main lake communicates with its southeastern annexes, depths diminish almost suddenly to 230 feet. It looks, therefore, as if Lake Titicaca had been imperceptibly falling during a period of unknown length. The lagoon of Umayo (near which stand the Inca buildings of Sillustani) was formerly connected, if tradition is right, with the lake; now the water has receded from the channels that established connection.

The only outflow of Lake Titicaca is the Desaguadero, a channel of sluggish waters draining into the lagoon of Poopó, in the southwest, which, in turn, has no visible outlet. There is traditional indication to the effect that the Desaguadero was opened (through some unknown process) at a very remote period, still within the scope of dim memory. It is also possible that, not many centuries previous to the Columbian Era, the lagoon of Uinamarca bathed a part of what are now the ruins of Tiahuanaco.

The water of Lake Titicaca is brackish, but not unwholesome. We had to drink it for several weeks almost exclusively, on the island of Koati, and felt no bad effects. It is always cold. At a depth of 99 feet Agassiz found its temperature to be 15° *centigrade*, at 450 feet 10°.6. Nobody has, as yet, been able to withstand its numbing effects longer than about a quarter of an hour.

There is, as indicated, a single outlet to the lake, the Desaguadero, and the feeders are few, on the surface. The Ramis and Suchez enter from the north, from the east the Rio de Achacache.

XUM

None of these rivers is more than an ordinary stream, not large enough for navigation.

During winter the sky is mostly of an intense blue, the air chilling, while the sun's rays scorch and burn face and hands. Still, thunderstorms occur every month, and snowfalls are not uncommon. In summer a lowering sky often covers the mountain ranges, which are the only redeeming feature of the landscape; thunderstorms are of almost daily occurrence, thunderbolts very frequent, and waterspouts not rare. We saw two together, in the middle of the lake, and reliable informers state that as many as five have been observed at the same time. During tempestuous nights St. Elmo fires gleam on the steamers' masts. And, yet, rare is the evening when, for a few hours at least, the Bolivian Cordillera does not shine out, even if thin vapour rises before it from the deep gorges at its foot, and seldom is the whole chain, from the Carabaya range, in the north, to Illimani, in the extreme south, completely shrouded. In August, when winter is at its height and the skies cloudless, the Bolivian Andes sometimes display an alpine glow of unequalled splendour.

Our observations of temperature on Titicaca Island, carried on for three and a half months in succession, and later ones on the same island and on its neighbour, Koati, indicate a very equable climate. The mean for January, 1895, was 54.9°; for February, 55.2°; in March, 54.8°. In winter of the same year temperatures were, of course, lower, but the extremes of temperature from January first to July first, 1895, were only 65° and 33°. I do not lose sight of the fact that such local observations, carried on for a short period only, have no value except for their time and the place where they were taken; but meteorological observations at La Paz extend over a period of many years, and establish the equableness of the climate beyond any doubt. That climate has, in fact, but two seasons—winter, which is cold and less moist, and summer, which is wet and equally cold. One is as disagreeable as the other, though not unhealthy.

To the coldness of the climate (first of all a consequence of the great altitude) the proximity of the snowy ranges contributes. In the west the few summits that rise above the snow-line between Puno and Moquegua, the Kaualluni, and the Uilcaconga, are neither high nor striking in appearance. The lofty ranges between Cuzco and Juliaca, towering Kunnu-Rona (Santa Rosa), and bold Vilcata, that rises above the source of the Amazon River, at La Raya, are too distant. But the eastern range approaches the lake as near

as twenty-five miles in its two culminating peaks of the Sorata group, the Hilampi, or Hanko-Kunnu, and the Hanko-Uma, rising respectively to 21,300 and 21,490 feet, according to latest determinations. The Sorata group terminates the "royal range" (*Cordillera real*) in the north. South of it that alpine chain of unsurpassed beauty in outline and in abundance of formidable glaciers, but without the softening feature of meadows and forests—grand, solemn, and chilling—extends to its southern pillar, Illimani, the altitude of which was determined by Sir Martin Conway, on his *first* (and thus far *only*) ascent, in September, 1898, at 21,190 feet. Between Sorata and Illimani the strikingly individualized peaks exceed, as far as known, twenty thousand feet at only two or three places. The Karka-Jake (erroneously called Huayna Potosi) reaches 20,300, and the Chachacomani 20,600 feet.

Glaciers abound on the *Pacific slopes* of the chain. The Atlantic declivity is very steep; hence shows few of these truly alpine features. At present, and for a number of years past, the glaciers of the Bolivian Andes have been in slow retrocession. The deep clefts, meandering from the fronts of actual glaciers towards the upper Puna, or tableland, bear every mark of having been eroded by glacial action at a very remote period.

North of the Sorata group there is a break in the continuity of the snowy range. The Andes of Carabaya lie farther from the lake basin than those of Bolivia, but are visible from the western shores and from Puno. Their relative altitudes are as yet but imperfectly known. Their most important and most northerly group, Ananea and Palomani, may yet prove higher than believed, for both snmmits rise out of enormous glaciers and snow fields. South of them the chain is made up of picturesque clusters of sharp peaks and cones; but the snow-line is not unbroken, as farther south. The eastern slope is, as everywhere else in that region, very steep.

This extensive barrier, separating Lake Titicaca from the wooded lowlands of the Amazonian basin, acts to intensify the chill in the climate of Titicaca. The Indian, who looks at nature only from the standpoint of the dangerous or the useful—who feels, above all, his own helplessness in presence of incomprehensible phenomena —sees in the stately peaks the abodes of spirits, and worships them as such. The taller the mountain, the more powerful the Achachila (literally, "grandfather") supposed to dwell in it. To the Indians of the main islands in the lake the principal *Nevados* appeal mostly as originators of angry blasts and damaging frost.

XUM

The region of the lake, as well as the mountains, has as yet been but partially investigated from a geological point of view. The crest of the Bolivian Andes and the upper slopes are Silurian, but here and there traversed by upheavals of syenite, as, for instance, at the so-called Huayna Potosi. Lower down and as far as the middle of the table-land, or Puna, Devonian strata appear. On the west the Permian formation prevails. The basin proper is also crossed by streaks of carboniferous rocks, containing stone-coal of a fair quality, not seldom accompanied by trachytic (andesitic) dykes. The Puna south of the lake is said to be Devonian in the main. Explorations conducted by Prof. A. Dereims, the French geologist, will at last furnish us a true picture of the geology of the region.

The mineral resources of the surroundings of Lake Titicaca are not inconsiderable. Coal does not, as yet, play any rôle in production, which is the more regrettable that its quality is good and the seams are of easy access. Copper in its native state, as large chunks or blocks, but chiefly disseminated in minute particles through a Permian sand-rock, in proportions varying from less than ten to seventy-five per cent., crops out at Corocoro, near the Desaguadero, in enormous veins tilted at an angle of about forty-five degrees. Tin is worked in the cordillera not far south of La Paz; and it is also found at Carabuco, near the lake shore. Silver ores abound in the district of Sicasica, and gold is now washed on a large scale at the very doors of the City of La Paz. In the mineral wealth lies the future of the lake region and in the industries therefrom resulting; neither the vegetable nor the animal kingdom offers any inducements.

At an elevation of twelve thousand feet, vegetation, even under the tropics, is reduced to a minimum. Not many spots on the lake-shore are sheltered enough to permit the growth of trees and of low, bushy maize. The surroundings of the sanctuary of Copacavana offer a succession of favoured nooks, where, besides some trees imported by the Spaniards, like the eucalyptus, the wild olive tree (*Buddleya coriacea*), the keñua (*Polylepsis racemosa*), and Sambucus Peruviana, grow in stunted specimens. This is also the case on the southern promontory of Titicaca Island, at Keñuani, and especially in two gardens on the island erroneously ascribed to the Inca, while they are both Spanish and of the eighteenth century, if not later. On these two lovely spots an abundance of European flowers and some vegetables, also strawberries, still thrive under the shade of imported and indigenous trees. On the

peninsula of Huata similar spots are found; elsewhere vegetation is limited to the dismal Puna grass (*Stipa Ichu*) and smaller shrubs, some of which are used by the Indians in medicine and witchcraft.

Alimentary plants may be divided into two classes—indigenous and imported. Among the former the *potato* occupies the first rank. It is the leading staple of the mountain region in general. But cold and moisture prevent its preservation in the natural state. Combustible to dry the potato there is not enough; hence the only means to keep it is to let it freeze, then press out as fully as possible every trace of moisture, let it freeze again, and thus, reducing the tuber to a mere cork-like, insipid mass, render it invulnerable against cold and humidity. The chuña, as this unpalatable metamorphosis of the (otherwise splendid) potato is called, is the main food on these highlands, and of all classes of society, without exception. Next to the potato comes the oca (*Oxalis tuberosa*), the quinoa (*Chenopodium quinoa*), maize, and the so-called papa liza, a most indigestible tuber of the potato kind. Imported alimentary plants are limited to barley and to a coarse, large bean, the haba. Vegetables would grow very well on the islands. We have seen, on Koati, plants that were almost arboriferous; but the Indian is far too conservative to change his diet. He prefers his primitive food, heavy and yet not nutritious, to wholesome aliments unknown to his ancestors.

Neither hill nor vale is without flowers. Along the lake and in sunny coves the kantuka—carmine, red, yellow, and white—droops from the branches among the vivid green foliage of a tall shrub. On humid expanses the panti-panti displays its white or pink blossoms. Verbenas cover the slopes in patches. Many an insignificant bush has a modest but pleasing little flower, and the quinoa presents, when in bloom, entire fields draped in the national colours of Bolivia—red, yellow, and green. On the other hand, miles and miles offer nothing to the eye but, along the shores of the lake, lonely gray or dull green, with rocks intervening, or, in the interior, interminable levels of coarse Puna grass, dotted by the adobe or stone huts of the natives, their tiny fields, and an occasional drove of llamas.

Animal life is irregularly distributed. The middle of the lake sees occasionally a gull (*Larus serranus*) following the steamer. Of the six kinds of fishes thus far known few specimens appear on the surface. It is on the shores of bays like the large one of Achacache, on the waters of the picturesque harbours of the island of Titicaca and the peninsula of Huata, also on the roadsteads of

Chililaya and others, mostly where the tatora or lake reed (*Malacochaete Tatora*) thrives in shallow places, that aquatic birds of the lake are mostly seen. The choka (*Fulica gigantea*), a stately water-hen of black metallic plumage, with bright-coloured head and bill, glides quietly over the little ruffled surface of inner bays. Turbulent divers (*Podiceps*, *Tachybaptus*, and *Centropelma*) furrow the water around them like diminutive tug-boats, crossing and chasing each other with amazing rapidity. Along the mainland the flamingo and the rose-coloured spoon-bill are not rare, and a dark-green ibis stalks over marshy expanses. An ashy gray night heron is sometimes seen erect on rocky points, and the black cormorant peoples smaller islands, affording the Indians, who visit them in frail balsas, a repulsive aliment in young birds and eggs with greenish yolks, both equally disgusting through their fishy smell and taste. A gray eagle soars over the rocks skirting the shores, and that handsome scavenger, the alkamari, stalks in pairs over fields and bare slopes. I forbear mentioning enigmatical beasts like the supposed seal, although there is enough in reports about the animal to excite legitimate curiosity. Neither do I dwell on the innocent toads, which the Indians gather and expose on dry rocks as often as they fear drouth. I also pass by the small scorpions, centipedes, and spiders, often disturbed by the opening of ancient sepulchres. But I cannot overlook the godfather of the Island of Titicaca, the species of wild-cat to which the name is due. *Titi* means the lynx-like feline haunting the shores of the Lake, from which, probably, it sometimes found ways and means of crossing over to the island. *Karka* (whence Kaka) signifies a rock, or cluster of rocks. The strangely-situated cliff on the island, which was a shrine since time immemorial, is called Titi-Kala, or *stone of the cat*, since there are on its vertical face some concavities recalling heads of cats, on which the Indians looked with superstitious awe. Hence the wild-cat (called *Mulu-Mulu* along the slopes of Illimani) has given its name to the main island, whence, after the sixteenth century, it became generally applied to the whole lake. To-day still, the Aymará call the water-sheet simply *kota*—lake or sea. The Titi pays disagreeable attention to domestic fowl. During the seventeenth century its occasional appearance on the island gave rise to the well-worn tale of the carbuncle, a cat with fiery eyes and a luminous stone on its forehead. In former times the vicuña and even the guanaco were occasional visitors of the lake-shore, and they roamed through the districts west and south of the lake. The eastern shore, as well as the

Andes, were and are, especially the latter, frequented by the vicuña only. What we were told about the occurrence of the guanaco is problematic. I would also allude here to the not uninteresting fact that the condor, that huge bird of prey and carrion, while roosting in the Bolivian Andes about Illimani, is hardly ever a visitor of the lake or the plateau, whereas the easily-domesticated Puna goose (*Benicla Melanoptera*) lives on one of the haciendas as tame as any ordinary member of the "civilized" species, and we had the daily visit of a pair of these handsome birds on the sandy shore of Challa, on the island.

Both the llama and the paca are kept in large numbers around the lake—the former as a beast of burthen, the latter for its precious wool. Along the base of the northern range, on the dismal and cold levels that skirt the snowy peaks of Suchez, of Katantika, Kololo and Altarani and Ca, the paca pastures by thousands. They do not, however, go up near the mountain passes, where, as all along the snowy range, emerald-green lagunes, fed from the glaciers, offer a far better drinking water than any on the Puna. The vizcacha accompanies the vicuña to the highest crests, but it also makes its home on the Puna, wherever clusters of rocks protrude. So does the chinchilla, on the Puna nearer the Chilian frontier.

Since the Spanish occupation the Indian has additional domestic animals. He has the ass, the mule, the horse, and cattle and sheep. But he takes no care of them; hence the breed is poor and weakly. The llama and its kind, however, he fondles, for it is a time-honoured associate.

Outside of the city of Puno and a few unimportant villages along the lake, the white population hardly exists. Indians—Quichua in the north and northeast, Aymará to the south, and Mestizos—are the overwhelming majority. Intercourse with them—protracted contact—is far from agreeable, especially with the Aymará, who are a retrograde, stubborn, and naturally bloodthirsty stock. Distribution of the settlements is unequal. After sallying from the lagoon of Chucuito, where the village of the same name and that of Acora are the chief places, we pass successively Juli, Ilave, Pomata, and Yunguyu, leaving Zepita in the distance. All these villages together, and their surroundings, have to-day, according to Peruvian statistics, as many Indians as at the time of the Conquest. The Peruvian coast is low and monotonous; it fronts the widest part of the lake called Pampa de Ilave, where storms are much feared. Already there, the largest island of the lake, Titicaca, appears, seemingly connected with the peninsula of Copacavana

facing it. As we approach, Titicaca detaches itself, assuming its true insular shape. It is about seven miles long, and has the form of an elongated toad. The lake makes not less than seventeen well-marked indentations into its shores, some of which are most picturesque bays. The backbone of the island is a long ridge, but the highest points lie outside of it—northwest and southeast. The former, Chullun-Cayani, overlooks the lake directly; the other, Pallasa, is off the shore, and both are 800 feet above the lake. The island is one of the most romantic spots imaginable, notwithstanding lack of vegetation. We lived on it for over five months in all, and, with all the inclemency of climate and the evil disposition of the eight hundred Indians who live on the two haciendas into which the island is divided—with all their constant disobedience of most positive orders from the owners to respect and attend us as if we had been the proprietors themselves—this marvellous island, with its coves, its promontories, its unparalleled panoramas and outlooks, its modestly picturesque ruins, remains, and will always remain, the ideal of our dreams.

It is as if a reflex of its beauty had been cast on the peninsula of Copacavana, from which it is separated by the narrow channel of Yampupata. The sanctuary of Our Lady of Copacavana, famous in Bolivia since 1586 (although the once beautiful church was only begun in about 1640,), stands on a lovely site; but, unfortunately, the village of Copacavana is a dreary hamlet, and only alive when the festivals of the Church gather thousands of boisterous Indians to dance in the plaza. Such dances are survivals to which the Indian clings with great tenacity, while their original meaning is only known to a small number of the aborigines. These celebrations, while attractive at first sight through quaintness and colour, become disgusting very soon through the carousals which form, and always formed, an indispensable corollary.

Copacavana has many natural charms. The triangle which the peninsula forms is as diversified in topography as odd in outline. Its Indian population is comparatively dense, of evil inclinations, and does not appear to have suffered any diminution since 1538. Tillage of the soil on a small scale and some cattle-raising give them occupation when their time is not taken up by feasting and carousing; and so it is all over Bolivia and the mountainous section of Peru.

Few lakes in the world have a greater number of islands and islets than Titicaca. Entrance to the bay of Chucuito is guarded by two large ones—Amantaní and Taquili, of which the latter has

served repeatedly as a place where political prisoners were left to pine. Beyond the main island of Titicaca, towards the Bolivian end of the lake, lies Koati—green, almost treeless, but notorious for its Inca ruins, not extensive nor architecturally remarkable, but well preserved and on a spot of unusual beauty, selected by the Indians for its warmth and because it faces the majestic summits of the Sorata chain, which are, to the Indian, very "big medicine."

Around Titicaca Island are a number of small isles, that appear like remnants of a former connection between the peninsula of Copacavana and that of Huata. The straits of Tiquina, very narrow, but not deep, and with steep, rocky shores, separate the two promontories. They also separate the main lake from the southern, comparatively very shallow, basins of Chililaya or Huarina, and of Uinamarca, at the southwestern end of which opens the Desaguadero channel. Between the two basins lie a number of not unprepossessing islands, mostly inhabited. There are about thirty of them, many of which bear ruins of primitive settlements. South of the lake expands the bleak Puna, between twelve and fourteen thousand feet above the Pacific, and, at a distance of forty miles south of Chililaya, the cleft of the La Paz River opens, through which that stream, hugging the mountain notch of Illimani, meanders to the basin of the Amazon.

Of the pre-Columbian condition of the inhabitants of Titicaca basin, many ruins, promiscuously scattered, bear testimony. Aside from those of Tiahuanaco, the past of which is still shrouded in mystery, ruins of Inca origin in the shape of more or less elaborate storehouses of stone and adobe, and ceremonial edifices of modest size on the Island of Titicaca, on Koati, and around Copacavana—finally the many vestiges of Aymará occupation in the so-called Chullpas or dwellings with house-burial, on the Puna as well as in the mountains—show that, in pre-Spanish times, the lake region was occupied almost exclusively by Aymará Indians. These had, to a limited extent, been overcome by the Inca tribe of Cuzco, but never incorporated into a national or political union, of which no aggressive Indian tribe in America had any conception. These ruins indicate a population not in excess of the present number of Indians, but of a shifting disposition, to which Spanish rule put an end. The influence of the Incas was limited to levying tribute, and their architectural remains in the lake basin indicate permanence only in very few places.

THE ECONOMIC IMPORTANCE OF THE PLATEAUX IN TROPIC AMERICA.

BY

J. RUSSELL SMITH.

The plateaux and plains of Tropic America offer an interesting paradox in their relation to the foreign commerce of those regions. The highlands are the chief seats of population; the lowlands are the natural and, indeed, the only place for the production of most of the large and increasingly important list of staples for which the non-tropical regions depend upon the tropical. Here is a vast field for ethnic and industrial readjustment, by which the people should locate themselves where they can have access to the resources.

A survey of that half of the American continent lying between the Rio Grande and the Rio de la Plata shows a topographic distribution of population the exact opposite of that prevailing in the temperate parts of the American hemisphere, in Europe, and in Asia.

In North America the early colonists established themselves in the Atlantic Plain, gradually worked up the valleys of the Atlantic rivers, and then westward into the basin of the Great Lakes, to the Valley of the Mississippi and its northern extension, which is fast becoming the seat of empire upon the continent. Along the Pacific Coast similar conditions are repeated. The valleys of California, Oregon, and Washington contain nearly all the population of those States, leaving large areas outside, with very scanty population.

In Europe the dense populations are on the good lands of the Great Low Plain, extending from the Pyrenees to the Urals, and in the valleys of the Po, the Danube, and the British rivers. In Asia the great preponderance of the people, possibly nine-tenths of the population of the whole continent, and half the people of the world, are crowded into the lowlands of the monsoon countries between the Indus and Manchuria and northern Japan. Upon these lands the summer monsoon rains make possible the growth of heavy summer crops. In over-populated Japan the agriculture is practically limited to 12 per cent. of the land—a mere fringe around the edge of the mountainous isles, where irrigation can be secured for intensive agriculture, as her mountain streams flow across the narrow plains to the sea.

Throughout tropic America the centres of population are, with certain exceptions, upon the interior highlands, and 99 per cent. of

the vast area of lowland skirting the two oceans, and sometimes reaching the interior of the continent, is an unsettled, unused land. Instead of being the home of peoples, as in the temperate lands, it has always been a bar to settlement, and is to this day a hindrance or a prohibition to commerce, and a vast land reserve of unknown possibilities for a more resourceful future to utilize.

In Mexico the geographers usually classify three zones—the cold, the temperate, and the hot,corresponding to the plateau, the slopes, and the low plains. Upon the first two are centred nine-tenths of the people. The plateau has in some sections a population as dense as that of France, and, considering its aridity, is really over-populated, and the pressure of people upon subsistence is causing an alarming denudation of the rather scanty forest growth. Aside from the small seaport cities, the lowlands have a sparse population of wild Indians, lumbermen, and other workers in the forest. A few new plantations have of late been started there, and this new work, in conjunction with recent railroad-building, has created a demand for labour that can only be met by importing labourers from the plateau, and one of the present reforms of the Government is to stop the carrying away of the highland-dwellers to involuntary servitude in the lowland forests.

Central America is still more pronouncedly a plateau country. The heavy rains from the trade-winds give dense forests to the slopes, and reduce much of the coastal plain to swampy jungle. The Atlantic plain being wider than the Pacific, the plateau between the double mountain ranges to the west was more easily reached from the latter ocean, from which it was settled, and through whose ports its commerce was for more than three centuries almost exclusively carried on. In recent years coastal settlements along the Caribbean have grown through the rise of the banana industry, and Costa Rica and Guatemala have shifted a part of their commerce to the east through the opening of railroads to Caribbean ports; but, in the main, Central America is still, economically speaking, a Pacific country, because the centres of population, being upon the plateau, lie nearer to that ocean, and use it as their highway to the outside world.

The Pacific Coast of South America shows, in the main, the same conditions. The marine plain from Panama to Central Ecuador is wet, forest-clad and, except for a few unwholesome ports, possessed entirely by a few wandering Indians. Ecuador consists of a fertile low plain containing one-fourth of the population, and a high, isolated, and hilly plateau between the ranges of the Andes,

upon which the remaining three-fourths of the people are crowded. Peru presents a similar spectacle, with comparatively dense population upon a plateau so high that men wear woollen masks to protect their faces from the cutting winds. The Peruvian coast lands have a greater development than any other in tropic America, owing to the aridity and healthfulness of the desert and a water supply from the Andes to support agriculture by irrigation.

In northern South America the outlying ramifications of the Andes mark the limits of the really-peopled districts. Columbia, drained by the splendid Magdalena, uses the surface of the river as a means of communication between the sea coasts and the isolated plateau settlements, while the great valley lies almost untenanted. Venezuela has a similar condition; but, fortunately, her plateaux, centring around Caracas, are nearer the sea. The Orinoco, with tens and hundreds of thousands of square miles of grass lands, and of forest lands, has a few feeble settlements, supplied by one trading steamer. This valley typifies the condition of the interior of the South American continent. One of the world's greatest plains extends from the mouth of the Orinoco to the mouth of the Rio de la Plata and from the mouth of the Amazon to the foot of the Andes—a region that doubles the area of the Mississippi Valley, with its 40,000,000 people, or the Yantgtse-Kiang, with 150,000,000. But the South American land is a land unknown. In northern Argentina, even outside the tropic, large rivers have never been correctly charted, and in the Amazon Valley American Commonwealths could be lost to the world if put down in the midst of unexplored reaches of jungle. Only the larger streams have been navigated by native and Portuguese rubber-gatherers and a few scientific expeditions.

In Brazil the centre of population is on the plateau lying inland from Rio de Janeiro and Santos, and on both sides of the Tropic of Capricorn. In this area, the centre of the world's coffee production, is the best-developed railway-net to be found in the Torrid Zone. The elevation of the district, however, robs it of full tropic climate.

The coast of Brazil has the largest seaports of tropic America—Rio de Janeiro, Bahia, and Pernambuco. These cities are all on a coast swept by the trade winds, and excepting Rio, which is the national capital and the port for a large interior district, they are the centre of producing districts of small area lying close to the sea. In British Guiana this characteristic is more pointedly brought to notice, because nearly all the exports of this large colony are grown on a strip of alluvium diked and reclaimed from the sea after

the manner of Holland. Furthermore, the coast settlements and cities from Rio de Janeiro to Guiana are largely populated by negroes or mulattoes, or, as in Guiana, by imported East Indian coolies.

The location of cities in tropic America shows forcibly the importance of the plateau. In temperate North America and in northern Europe there is no national capital that is not located on a low plain. Many of them are seaports, and all can be reached from the sea by at least river or canal navigation. In all tropic America there are eleven independent nations, excepting Panama, and, of the twelve, but one, Brazil, has a capital city that is also a seaport. The Brazilian capital is not fully maritime, since the suburb of Petropolis, on the escarpment of the plateau, over 3,000 feet above, is the real administrative centre, the residence of the Diplomatic Corps and the Brazilian aristocracy, and it has also a growing textile industry. The other ten capitals of the American tropic are beyond the reach of any kind of navigable connection with the ocean, and are usually situate upon plateaux from 2,000 to 9,000 feet in elevation, where good drainage and cool and wholesome climate prevail.* The colonies of Guiana and Belize and the Republic of Panama do not enter into this comparison, because they possess no available plateaux for capital sites.

This centring of city, as well as country, life upon the plateau leads to a peculiarity which may really be called a division of city functions. In the temperate zone every seaport develops in time into a considerable industrial centre, the productive industries often supporting more of the population than the purely commercial. In the greater part of tropic America these two services are separated, and the city may be thought of as in two parts—one the port commercial, the other upon the highland as industrial, administrative, and residential. In Costa Rica the capital, San José, has its port in Port Limon; Caracas has La Guayra and Puerto Cabello; Lima, Callao; and Santos, Brazil, with 20,000 people, is the greatest coffee port in the world and the port for São Paulo, a thriving plateau city with a population of nearly 200,000. Each of these ports is much smaller than the city for which it is the outlet, the ratio ranging from about one-third to one-tenth, or even less; the City of Mexico having over 700,000 people,† and the combined populations of the ports of Vera Cruz and Tampico not more than 50,000.

* These statements require modification. Lima, the capital of Peru, stands on a plain less than 600 feet above the sea and within seven miles of the Pacific; Buenos Aires, the capital of the Argentine Republic and its largest seaport, is on the La Plata estuary; and Montevideo, the capital and chief seaport of Uruguay, is on the north side of the same estuary.—(EDITOR BULLETIN.)

† According to the census of 1900 the population of Mexico was 344,721.

The economic effect of this predominance of the plateau is that the population is located on the least productive lands, and commerce is handicapped by the great difficulty of reaching the sea. This difficulty at times borders upon prohibition—and it is prohibition for commerce in any modern sense of the word. The upland dwellers of Ecuador, for example, numbering hundreds of thousands, possibly a million, and including the capital of the country, were, until the beginning of railroad work now in progress, dependent for connection with the outside world entirely upon a mule-trail, where life and property were often threatened with destruction by slipping from narrow rocks to abysses below. Another part of this same trail crosses the lowlands, which rainy seasons often made impassable for even pack animals. This case is extreme in the number of people dependent upon a single route; but it is fairly typical of the conditions that lie between a large proportion of the people of tropic America and the world highway, the ocean. As a natural result of this isolation, a large proportion of these people have almost no foreign commerce whatever. The statement is not made that any single country has no foreign trade, for they all have; but also they usually have a considerable share of the people who have almost no part in this trade, and who live in a house of local construction, sometimes without an iron nail in it, eat home-grown food entirely, and wear clothing of the meagrest pattern, possibly of homespun, possibly imported cloth.

These facts are indicated by an examination of the products exported from these regions. Classifying them in two lists, we see the relative part taken by the highlands and the lowlands.

List of Products Exported from Tropic America.				Staple Tropical Products Imported by Temperate Peoples from Eastern Tropics.
Plateau products.	Lowland products.			
Coffee.	Rubber.	Cabinet woods.	Brazil nuts.	Tea.
Ores and metals.	Sugar.	Dividivi.	Cochineal.	Rice.
Hides and skins.	Cocoa.	Spices.	Fibres and bristles.	Manila hemp.
Wool.	Banana.	Sarsaparilla.	Cocaine and drugs.	Jute.
	Orange.	Vanilla.	Panama hats.	Varnish gums.
	Cotton.	Indigo.	Many miscellaneous articles in small quantities.	Pepper and other spices.
	Tobacco.	Cinchona bark.		
	Gold.	Cocoanut.		
	Asphalt.	Ivory nuts.		
	Cedar.			
	Mahogany.			
	Dyewoods.			

The plateau list is short but important in the volume and value

of its articles. The lowland list is much longer, with no single article equalling in importance the two leaders in the plateau column; but as a group they are exceedingly important for modern commerce, and of great promise for the future. Only one of the plateau products is really tropical—coffee; and it is not fully established that it is limited to plateaux. Some very suggestive experiments in coffee culture are being carried on at low elevations in Mexico. The ores and metals are natural mountain products in all climes, and the mountains in the countries under review are rich in minerals. The skins of cattle, goats, sheep, deer and other wild animals, are commodities of high value, good keeping qualities, and easy transport, and, along with some wool, they make up the most universal basis of export from the plateaux, and, along with metals, pay for the meagre imports of those regions which are not so fortunate as to grow coffee. It thus appears that many of the people within the Torrid Zone are trading exclusively in non-tropical produce, and that the large majority of the population, those upon the plateau, have probably a small majority of the commerce, including but one tropic product of importance.

There yet remains a long list of really tropical and lowland products, the ones we think of when the word "tropic" is spoken —rubber, cacao, sugar, bananas, mahogany, dyewoods, and all the roots, fruits, nuts, drugs, extracts and products of the forest, the palm, and the cultivated field. These much-sought products give a greater *per capita* foreign trade to that small proportion of the population living in the lowlands. The growth of their population has not yet responded to the growth in their trade. Almost without exception, the natural and cultivated products of the American tropics are in increasing demand in North America and Europe, where they are required as food or as raw materials of industries. Moreover, several staples of the eastern tropics may possibly, with proper industrial conditions, be cultivated in America; and rice certainly can be, although it is now imported by every country between Cape Horn and the Arctic Ocean.

The needs of world commerce require the products that may be produced in the lowlands of tropic America. Can the population of these regions increase to meet these demands? Under the present conditions it does not promise to do so, but there are at least two ways in which it may become possible. One is by the introduction of Asiatics accustomed to similar climates. This policy the British have tried in some of their colonies, but the

independent countries of the American continent have not as yet made a success of that method.

The other means of peopling these lands is by the application of science to eliminate the tropical diseases that are now so fatal to white men and harmful to others. This is a possibility that is just arising, but which may re-discover to us the New World during the present century. Most of the particularly troublesome and so-called contagious diseases are now explained as due to or transmitted by the activity of animal organisms of various kinds. Once the danger is known it may usually be averted by combating some insect or germ, or by inoculating the person, so that the germs have no effect. Within the memory of living men smallpox has declined from the position of the world's greatest plague to a second-rate disease, due only to carelessness. Typhoid fever is known, and with care can be controlled and prevented. Millions of our contemporaries have followed the steps by which mosquitoes have been proved the guilty agents in the spread of the dread and mysterious yellow fever, and the disease has in places been stamped out completely. In the same way the sleeping sickness of Africa is now known to be due to a variety of the tsetse fly and malaria, the bane of tropics and lowlands everywhere is now explained by science as another of the insect-carried diseases. As medical science has just begun to study these questions systematically, it is fair to presume, in the light of present progress, that the time is not far distant when it may be almost or quite as easy to keep free from disease in the Mexican plains, in the Amazon or Magdalena Valleys, as in the Mississippi Valley.

If such a condition is attained, it but remains so to organize lines of transportation that travel will be easy from the hot lands to the nearest section of plateau, and so to organize society and industry that vacations for men and recreation and recuperation for women and children may be easily obtained upon some cool plateau, with which the tropics abound. There the depressing effects of long-continued heat will be avoided. In this respect it will resemble the life in American cities, from which people migrate by the hundreds of thousands in the heated season.

If society and industry can be so organized world population and world trade will experience transformations of a magnitude witnessed but once before in the history of the world—the settlement and development of the Mississippi Valley. Millions of square miles of the most fertile land will be opened to the surplus populations of Europe and America, and the seat of empire in the

tropics, as in the temperate zone, will shift to its natural place on the shores of the sea and the banks of great rivers. The present possibilities of production on these lands are no index for the future, because science has not yet been applied to tropic agriculture. If it is applied by these new populations, world commerce will surge forward because of the production of commodities that cannot be grown elsewhere and which are desired for daily use by the men of all climes.

THE ALASKAN RANGE.

A New Field for the Mountaineer.

BY

ALFRED H. BROOKS.

The Pacific margin of North America preserves a northwesterly trend for a stretch of nearly 5,000 miles, along the west coast of Mexico, the United States, Canada, and a part of Alaska; then in latitude 60° bends sharply to the southwest, as if to meet the northeastern arm of Asia, thrust toward it in the peninsula marking the eastern terminus of Siberia. Parallel to this western coast of America, and forming a mountain barrier almost unbroken from Mexico to Alaska, runs a series of mountain ranges—the Sierra Madre of Mexico, the Sierra Nevada and Cascades in the United States, the Coast Range of British Columbia, and the St. Elias and Alaskan Ranges in Alaska. Like the coast-line, the latter two, which constitute the northern portion of this barrier, make an abrupt bend to the southwest, and stretch away toward Asia. If we in the same manner follow the other great mountain system of western North America, the Rocky Mountains, in its northwesterly course through Alaska, we find that on reaching the Polar Sea it, too, bends to the west toward Siberia. In fact, this is the continental tendency, and is the topographic expression of far-reaching movements of the earth's crust.

This turning-point of the geography of the continent can be regarded as a great hinge, on one side of which the direction is North American, and on the other Asiatic; in other words, the meeting-place of the Old World and the New. Along this hinge

line rises the magnificent Alaskan Range, which lifts its snowy crests far above the other heights of North America; and almost

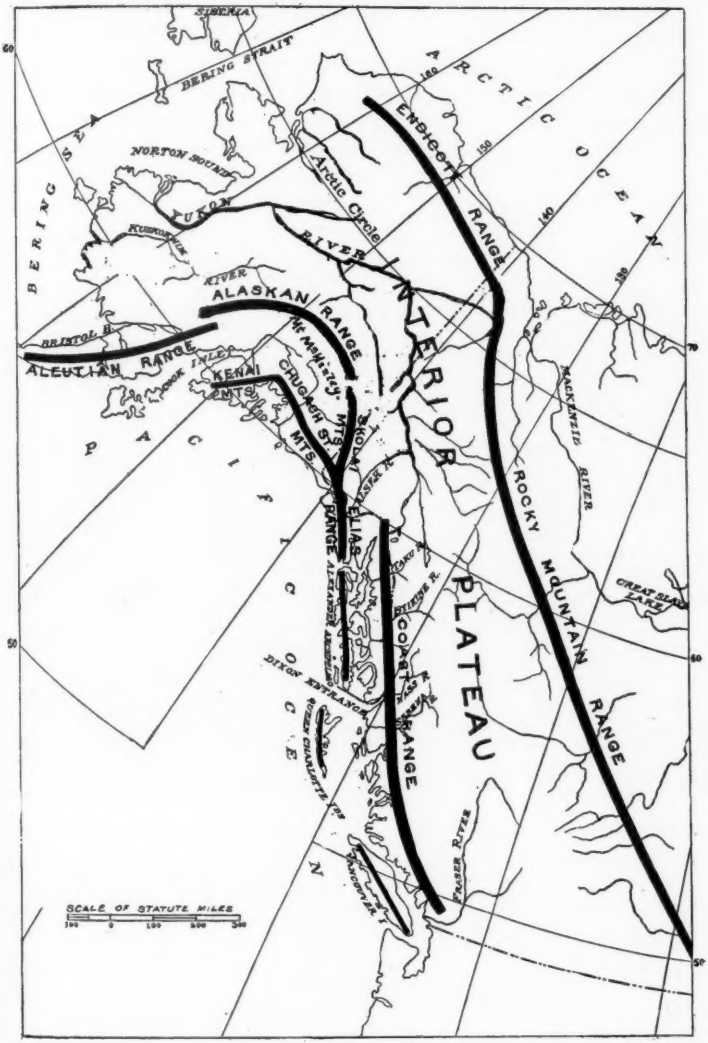


FIG. 1.

at the very axial point, towering 10,000 feet above the crest-line, stands the mighty dome of Mt. McKinley, the highest peak of our

continent—just as if Nature had placed this great monument to mark the spot where the Old and New World ranges meet.

Twelve miles to the southwest Mt. Foraker rises to 17,000 feet, second in grandeur only to Mt. McKinley. These twin peaks, with three others of great height, which I have named Mts. Dall, Russell, and Hayes, after explorers of this northland, help to define the crest-line of the Alaskan Range, the watershed between streams flowing into Bering Sea on the north and west, and those that find their outlet in the Pacific on the south. Along its western front the range falls off steeply to a smooth, treeless plateau; on its southern it sinks imperceptibly through a broad belt of rugged mountains to a great timbered lowland drained by the Sushitna,

HE WHO WOULD MASTER UNATTAINED SUMMITS.

one of Alaska's larger rivers, which pours its muddy, glacial-fed waters into Cook Inlet.

Here lies a rugged highland area, far greater in extent than all of Switzerland—a virgin field for explorer and mountaineer. He who would master unattained summits, explore unknown rivers, or traverse untrodden glaciers in a region whose scenic beauties are hardly equalled, has not to seek them in South America or Central Asia, for generations will pass before the possibilities of the Alaskan Range are exhausted. But this is not a Switzerland, with its hotels, railways, trained guides, and well-worn paths. It will appeal only to him who prefers to strike out for himself, who can break his own

trail through trackless wilds, can throw the diamond hitch, and will take the chances of life and limb so dear to the heart of the true explorer.

To the big game hunter it will prove a field unequalled on this continent. He will find among the mountains the dazzling white big-horn of Alaska, while in the foot-hill region the great Kodiak grizzly, the largest bear in the world, will test his nerves. Moose abound in the river bottoms, and herds of caribou roam over the timberless plateau. Down on the lowlands the frequent ponds are

MOUNT MCKINLEY.

breeding-grounds of duck, geese, and sandhill crane, and grouse are to be found among the spruce forests; above timber-line the ptarmigan, the characteristic Alaskan game-bird, changing his plumage with the seasons, meets the eye at every turn.

Fascinating as this field will be to the explorer and hunter, yet to the mountaineer it offers a compelling challenge; for above all the giants of our western cordillera—Whitney, Shasta, Rainier, St. Elias, Logan—rises the unattained summit of Mt. McKinley, king of North American mountains. Whether seen from a distance or

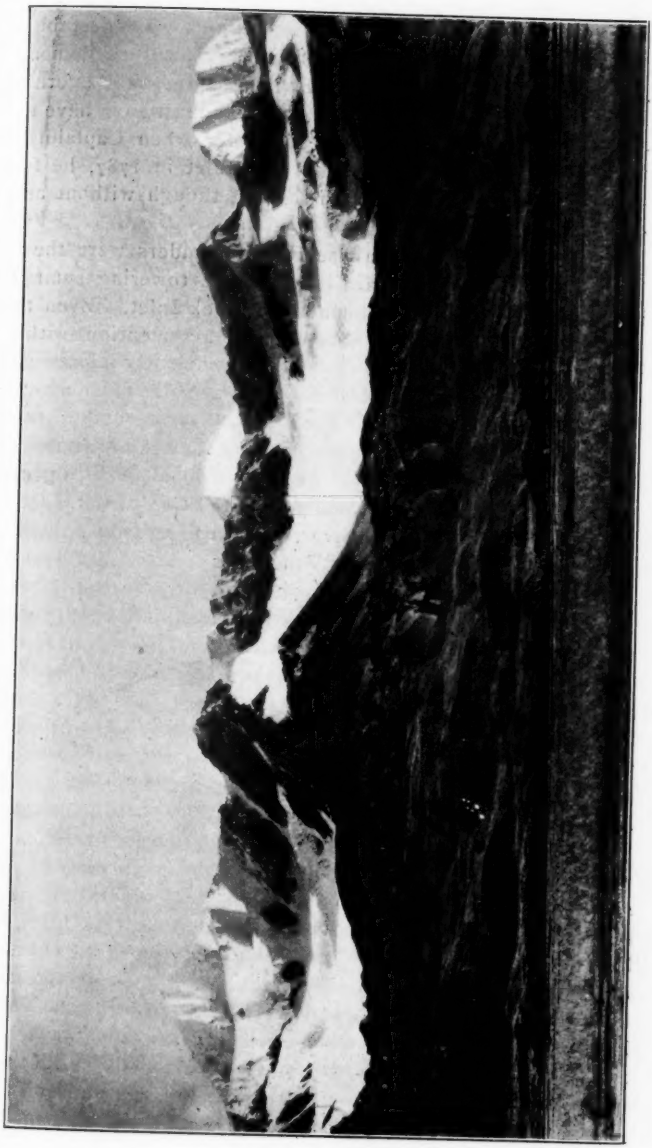
close at hand, it is ever impressive, with its 20,300 feet more than half-buried in snow. So high it towers that, in the clear atmosphere of Alaska, it is visible for nearly 200 miles in every direction, from tidewater of the Pacific on one side to the banks of the Yukon on the other.

Who shall name the discoverer of this culminating peak? No doubt the first comers to this part of the continent, evidence of whose presence is furnished by the stone implements found in the caves of the Aleutian Islands, knew the mountain, and used it as a landmark in their hunting journeys. Certain it is that the two tribes whose hunting-grounds were separated by the mountain-barrier each had a name for it long before the appearance of the first white man. The Cook Inlet natives called it "Traleyka," meaning "highest land" or "big mountain;" but to them, essentially a salmon-eating coastal tribe, and only secondarily hunters of big game, it was merely a distant point, to which they attached no especial importance.

The Kuskokwim natives, on the north side of the range, were hunters of the bear, caribou, and moose found along the piedmont plateau, and their excursions frequently led them to the very base of the mountains. What more natural than that the two imposing peaks towering above them should become interwoven with their folk-lore? The higher one they called "Teenali," regarding it as the progenitor of the great barrier which marked the limit of their realm. Their journeys through the passes of the range were few and hazardous, for beyond were alien tribes of different language, who were prone to war.

The first explorer to visit the region lying in sight of Mt. McKinley was the famous English navigator, Captain Cook. His journey around the world, begun a few days after the signing of the Declaration of Independence, brought him two years later to the mainland of what is now Alaska. Entering the great embayment which bears his name, he explored it until turned back by shallow water, deeply disappointed that it was not the long-sought passage to the Atlantic. During his brief stay at the head of the Inlet clouds must have veiled the mountains, or they would scarcely have escaped notice in his very circumstantial journal of the voyage, even though his interest lay in the waters and not in the land.

At the time that Cook explored the mainland of Alaska the Russians, striking out from Siberia, had already obtained foothold in the Aleutian Islands. Step by step their traders followed the chain eastward, harvesting the valuable sea-otter skins, of whose



SOME PEAKS IN THE ALASKAN RANGE.

worth the natives had no conception. In the course of years they spread gradually along the southern coast, and in 1783 established a colony on Kadiak Island, the first permanent settlement in Alaska. From this post, which then represented the easternmost extension of Russian occupation, the traders must soon have made their way along the shores of Cook Inlet; for when Captain Portlock, one of Cook's officers, visited the Inlet in 1787, he found the Russian traders already in possession, though without as yet any permanent habitation.

It is fair to assume that these Russian traders were the first white men to behold Mt. McKinley, whose towering summit is visible from many points at the head of Cook Inlet. Even they, savage to barbarity and cruel almost beyond conception, with but one thought in their minds—furs—were sufficiently impressed by the mountain to give it the name "Bulshaia," meaning "big mountain." As such it was known in Russian literature; but, strange to say, references to it were few. During the three-quarters of a century that the Russians held sway occasional exploring expeditions visited the coast, and some penetrated Cook Inlet. One of these was led by George Vancouver, who in 1794 had assumed the task of extending Cook's surveys. Vancouver appears to have caught a glimpse of the Alaskan Range, for he makes mention of "distant stupendous mountains." This is the first definite reference which I have been able to find to these high mountains, though it is quite possible that they are mentioned in some of the older Russian narratives.

When, in 1834, Malakof, an employee of the Russian-American Fur Company, which controlled all of Alaska, made an ineffectual attempt to ascend the Sushitna River, he must have been in sight of Mt. McKinley as he dragged his clumsy Russian boat against the swift current; but his mission was to find virgin fields for the fur trader, and he seems to have paid no heed to the mountain.

After Russian America became a possession of the United States, in 1866, the fur trader continued his vocation on Cook Inlet, and still we find almost no mention of Mt. McKinley. In the course of time a few hardy pioneers, chiefly traders and prospectors, made their way inland across the coastal barrier and explored the Yukon basin. Little is known of their journeys, which must have been accomplished with great difficulty, but there is evidence that they saw the mountain, though only at a distance; and stories of its stupendous height were told in many an isolated trader's post and around many a lonely camp-fire. Such rumours, however, did

not reach the outer world in sufficiently definite form to be noted by cartographers.

Thus as the years rolled on this high peak was known only locally to whites, not one of whom recognized the importance of calling the attention of geographers to its position.

In 1886 Lieut. (now Major) Henry C. Allen, U. S. A., since grown prominent in the Philippines as chief of the constabulary forces, was sent to Alaska, at his own suggestion, to explore the Copper River. Fascinating as would be a description of his daring journey, hardly equalled in the annals of Alaskan exploration, we are concerned only with his observation of Mt. McKinley. While making his dash down the Tanana in a flimsy skin boat, half-starved, Allen persistently kept up his topographic notes. He records far to the south of his route a rugged, snow-capped range, and he sketched in profile the several peaks of exceptional altitude. Allen was, however, 150 miles away, and could not realize that he had looked upon the highest peaks of the continent.

The finding of gold on Cook Inlet in 1894 quickly wrought great changes in its population. The trader who was content to remain at his post and wait for the natives to bring him furs for barter was succeeded by the restless prospector, who, following the traditions of his class, struck out in search of new fields. Some pushed their way up the Sushitna, and must have obtained glorious views of the Alaskan Range; but they were seeking gold, and were little interested in the cause of geography, until, in 1896, W. A. Dickey was struck by the stupendous height of the largest in the group. Though he was probably no nearer to it than a score of others, he seems to have been the first to recognize its geographic importance. Without instruments, he made a bold guess that it exceeded 20,000 feet in altitude, and had the enterprise to give it the name "Mt. McKinley" and to make public his observations.

The world at large paid little heed to this discovery, looking upon it as just another of the wild tales which emanated from Alaska. But at the same time that Dickey was stemming the mad current of the Sushitna an event occurred which was destined to change Alaska's position in the mind of the world—the Klondike gold was discovered. Then it was that the Federal Government awakened and attempted to make up for its long neglect of this vast domain. Money was appropriated to develop its resources, and among the various departments enlisted for the work the United States Geological Survey was enabled to begin the series of

explorations which has been extended during the past seven years to some of the remotest parts of the Territory.

Of the six Survey parties despatched to this new field in the summer of 1898, one, led by George H. Eldredge and Robert Muldrow, held its course up the Sushitna River, hoping to cross the range and reach the Yukon basin beyond. But this was no easy matter. After dragging their heavily-laden canoes against the swift current to the source of navigation, they struck out on foot, each man shouldering as large a pack as he could carry. A hundred miles' march brought them across the divide, only to find their way barred by a river and their provisions so low that they were forced to turn back, half-starved and worn out with the hard work. They had not reached the Yukon, but their triangulation surveys along the river had located and determined the height of the high mountains to the west, substantiating Dickey's phenomenal estimate.

In the face of similar difficulties, two other parties carried surveys within the shadow of the Alaskan Range—one, under J. E. Spurr and W. S. Post, up a western fork of the Sushitna, and down the Kuskokwim to Bering Sea; the other, led by W. J. Peters and myself, up the White River and down the Tanana to the Yukon. Both expeditions gained valuable knowledge of the location and character of the range, though their routes lay far from the two great mountains at its heart.

These three explorations of 1898 had blocked out an area of about 50,000 square miles, within which lay the high peaks. Mt. McKinley was gradually becoming something more than an Arctic myth. In response to the demand that now arose for further information, the army entered upon the scene in the person of Lieut. (now Capt.) Joseph S. Herron. With five white men, two Indian guides, and fifteen horses, he landed on the north bank of the Keechatna early in July, 1899, and struck out westward toward a pass in the mountains which lay to the north of the one discovered by Spurr. All went well with Herron until he had traversed the range, which took his Indian guides to the limit of their hunting-grounds, and hence their knowledge. Frightened at the prospect of entering the great unknown beyond, the two valiant warriors stole away one night and left the expedition very much perplexed. Resolving to push on, however, they followed the course of the Kuskokwim, previously surveyed by Spurr, and, after many hardships—scarcity of grass, shipwreck on a raft, the loss of provisions, the many obstacles to their progress—they were at last found by

natives, and led to the army post at the mouth of the Tanana. The journey which had been planned for a summer's trip had taken them nearly six months. They had approached within 50 miles of Mt. McKinley; and, first of white men, had seen its northern base.

Herron's exploration, even though he was unable to carry on any instrumental surveys, reduced the size of the unknown area, but as yet no one had actually set foot upon the mountain. After the miscarriage of Herron's plans, it was for some time deemed impossible to make the journey from the Pacific waters to the Yukon, along the base of Mt. McKinley, within the short summer of this northern region. Three years' cumulative experience of the country, however, convinced the Geological Survey authorities that it

GLACIER IN THE HEART OF THE ALASKAN RANGE.

could be done, and the burden of proof was assigned to a party under my leadership, with D. L. Reaburn as topographer and L. M. Prindle as geologic assistant. The story of our summer's journey I have told elsewhere; merely an outline will serve our purpose here.

We left Cook Inlet about the first of June, with 20 horses, carrying 105 days' provisions and equipment for our party of seven. A month was spent traversing the great swampy lowland lying between tidewater and the mountains. The horses were swum over three rivers, and forty miles of trail were chopped—the latter no easy task for so small a party. Meantime our worst hardship, the mosquito

pest, so wore upon the strength of man and beast that it seemed at times as if our project would have to be given up at the outset.

The middle of July, however, found us traversing the Alaskan Range by a pass we had discovered, lying between Herron's Pass to the north and Spurr's to the south. After gaining the western slope we laid our course northeast close to the mountains, thus avoiding the lowland, which had proved so disastrous to Herron. Many swift glacial rivers surged athwart our line of march, each presenting its own problem of crossing; but finally, at the end of the second month of hard travelling, we pitched our camp at the base of Mt. McKinley, only 15 miles from the summit. On that day, when I stood at snow-line on the flank of the mountain, within nine miles of the top, the first white man to approach the highest peak on the continent, the first to behold the rugged grandeur of its snow and ice covered mass, all the dangers and hardships which we had encountered seemed a small price to pay for such an experience.

Our mission of exploring and surveying did not permit us to attempt the summit, which loomed temptingly 17,000 feet above our camp. With the season over half-spent there was no time to linger; we must on to the Yukon. After a journey full of interest we reached the banks of that river on the 15th of September, having traversed 800 miles of unexplored region, and swum, forded, or bridged nearly two score rivers and streams. An instrumental survey, thanks to Reaburn's indefatigable energy, was carried on throughout the journey; and this expedition completed the exploration of the west front of the range, as Eldridge's had the east front four years before.

Reports of our experience awakened no little interest among those possessed of a taste for exploring, and plans were soon projected to ascend the mountain. Mr. James Wickersham, one of three district Judges of Alaska, was the first in the field. Those who may think such a feat rather an unusual undertaking for a member of the highest tribunal of the Territory should e flect that the life of a judge in this frontier region is by no means comparable to that of his colleague in a more civilized community. Every year Judge Wickersham travels thousands of miles—by steamer and horse in summer, by dog-team and sleigh in winter. His position, therefore, requires not only legal training but also power of endurance; and it was not an unnatural impulse that led him to undertake this journey of hundreds of miles into an almost unexplored region between his terms of court.

No circumstantial account of Wickersham's journey has ap-

peared in print, but it is known that he reached the base of the mountain after a long journey from the Yukon by steamer and pack-train. Failing in his attempt to reach the summit, he made his return through a series of thrilling experiences, covering part of the journey by raft.

About the time that Wickersham had resumed his official duties, Dr. Frederick A. Cook, of Arctic and Antarctic fame, landed at Tyonek with a small party of men and horses, including Fred Printz, who, as packer of our party the preceding year, had shown a resourcefulness which contributed largely to the success of our expedition. Reaching the base of the mountain by the trail which we had established, Cook made a valiant but unsuccessful attempt

A MOUNTAIN VALLEY.

to reach the summit. His most important results were realized on the return journey, made through the very heart of the range—a daring piece of work, which furnished a valuable contribution to geographic knowledge.

But Mt. McKinley still remains a challenge to the mountaineer. There is still a splendid field for the explorer, for, besides the two monster peaks whose summits have yet to be scaled, there are a score of lesser height. It will be strange indeed if some American does not take up the challenge now that the path is broken to this highest range on the continent, which in the past six years has emerged from the clouds of myth and stands an actual reality.

A PHOTOGRAPH OF MOUNT EVEREST.

This photograph, which is taken from the *Geographical Journal* (May, 1905), is the only one that gives a good idea of the highest summit of the world. Where the mountain has been observed from India or Nepal, in every case at a distance of 60 to over 100 miles, it is so nearly surrounded by other mountains that only the top of it can be seen. Every point of view from the south gives only a faint idea of its elevation.

The picture here shown is the first to be taken from the north

MOUNT EVEREST FROM KHAMBA JONG.

side of the Himalayas; and though the camera was 105 miles from the mountain, the photograph shows in a striking manner the configuration of Everest.

The photograph was made at Khamba Jong by Col. Younghusband during his four months' residence at that Tibetan fort in the summer of 1903. This region in southern Tibet had been hitherto inaccessible to white men. Col. Younghusband writes with enthusiasm of the wonderful view of Everest revealed from this point of vantage:

Every day and every hour enjoying the charming summer climate, and, above all, the unrivalled

panorama of the mighty Himalayas at the very culminating point of their grandeur, where all the loftiest peaks in the world were majestically arrayed before us. . . . As I looked out of my tent in the early morning, while all below was still wrapped in a steely gray, far away in the distance the first streaks of dawn would be just gilding the snowy summits of Mount Everest, poised high in heaven as the spotless pinnacle of the world. By degrees the whole great snowy range would be illuminated and shine out in dazzling, unsullied whiteness. Then through all the day it would be bathed in ever-varying hues of blue and purple till the setting sun clothed all in a final intensity of glory, and left one hungering for daylight to appear again.

Captain Wood stood 45 miles nearer to the mountain last summer than the place where Younghusband's camera had been set up the previous season; but Wood was on the south side of Everest in Nepal, and what he saw there inspired merely the laconic remark that "from this place Mount Everest is an insignificant point just visible in a gap of the main range."

Perhaps the most important information brought by the party which Captain Rawling led due westward, when the British expedition was returning from Lhasa to India last year, was that there is no mountain nearly so high as Everest to the north of it. It is probable, therefore, that Mount Everest will always have the distinction of overtopping every other peak.

COMMANDER PEARY'S START FOR THE ARCTIC.

The Peary polar expedition on the new steamer, the *Roosevelt*, started on Sunday, July 16, from its anchorage in the North River, for Sydney, C. B., the Smith Sound channels, and the Arctic Ocean. On July 11 the sealer *Erik*, which had been chartered as an auxiliary vessel, left Sydney for Smith Sound with 600 tons of coal and a supply of whale pemmican that had been prepared for Mr. Peary, for dog food. The *Roosevelt* left this port with full supplies for two years, a complete equipment for the exploratory work, and 400 tons of coal. The buoyancy of the vessel fully met Mr. Peary's expectations, and this was especially gratifying, as fears had been expressed that on account of the great weight, in proportion to its size, of the hull, heavily strengthened, as it is, at every point, her cargo carrying-ability would be much reduced. These fears, however, have proved to be groundless.

During the last few days of preparation the funds at the disposal of the explorer were increased by contributions from a number of gentlemen and by benefit performances given by the Boer War Exhibition at Coney Island to the amount of over $51,000, and he was thus able to make many very desirable additions to his equipment which otherwise he might have been compelled to forego.

It is due to the munificence of Mr. Morris K. Jesup and other members of the Peary Arctic Club, Mr. George Crocker and other private contributors that the Peary expedition has started north with a splendid ship and adequate resources of every kind. Of the $51,000 above mentioned, Mr. Morris K. Jesup contributed $25,000, Gen. Thomas H. Hubbard $10,000, and the Boer War Exhibition $500. The fact is also now made known that in January last Mr. George Crocker contributed $50,000 to the fund.

When he left New York, Mr. Peary expected to take on about 200 more tons of coal at Sydney, where Captain Bartlett, who will command the *Roosevelt* under Mr. Peary's orders, will come aboard with his Arctic crew. The explorer is accompanied by his former assistant Matt Henson, Charles Percy, his old steward, Dr. Louis J. Wolff, physician, and Rosse Marvin, geologist. The crew will number 15 men. The full roster of the expedition, as it leaves Sydney, will be printed in the BULLETIN later. The explorer is accompanied by his family as far as Smith Sound.

Mr. Peary expects to arrive in the Smith Sound region early in August, and will there add walrus to his supply of dog food. He will take on board the *Roosevelt* all the Smith Sound natives who can be utilized, together with their dogs. He will depend entirely upon these Eskimo dogs to haul his sledges. On his way north through the channels leading to the frozen sea he will probably establish supply depots at Fort Conger, Cape Lawrence, and Cape Frazer. If the ice conditions in the straits prove to be bad, everything possible will be done to force a passage through, the *Roosevelt* having been specially built to do the hardest kind of ice work; and dynamite will be used, where necessary, to open a channel.

The explorer hopes to spend the dark months of next winter on his ship, probably near the coast of Grant Land, with his Eskimos camped on the neighbouring shore. Meteorological and magnetic observations will be carried on during the winter, and the preparations for the sledge journey to the North Pole will fill many of the waking hours.

As soon as there is sufficient light in February the pioneer sledge party of Eskimos, with a leader, will start over the sea-ice and will quickly be followed by the main body. There will be from twenty to twenty-five sledges in the two parties, with six or eight dogs to a sledge. The scientific instruments on this journey will be those required to take observations for position, thermometers, and sounding apparatus. The journey to the Pole and back again to the land-base will be about 800 miles, and,

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if good fortune attends his enterprise, Mr. Peary thinks that he should rejoin his ship some time in June next year. If he succeeds in reaching the Pole during the spring sledging season of 1906, he will be ready to start for home as soon as he returns to the vessel, will try to force his way southward to the open water below Smith Sound, and should reach this city by September or October, next year, fifteen or sixteen months after the *Roosevelt's* departure from New York. A prize fund of $25,000 will be distributed among Peary's men if the Pole is attained and the expedition returns to New York within eighteen months.

If, on the other hand, he does not succeed in reaching the Pole next spring he will make another attempt a year later. It is hoped, in fact, that before circumstances compel him to return home he will have a sledging season so favourable for his undertaking as to enable him to achieve the task before him.

The *Roosevelt* attracted much attention after her arrival in New York. She came from Portland, Me., in charge of Commander Peary, and reached her anchorage off Forty-second Street, North River, on Sunday, July 2. She came under steam, and on the way along the New England coast gave evidence of her sea-going qualities and manageability that was in the highest degree gratifying to the explorer and the officers and crew. She made ten knots an hour, drove easily and with little rolling, and responded quickly to every turn of the wheel.

On July 3 the *Roosevelt* was placed in a dry dock in Hoboken, where the hull was cleared of the barnacles and other material that had become attached to the bottom, and a few more bolts were put through the prow, and the vessel then returned to her anchorage in the North River.

A number of persons improved the opportunity while she was in the dry dock to study the model of the fourth vessel to be especially built for polar exploration. The *Roosevelt* resembles the *Discovery* more than the *Fram* or the *Gauss*; but she is egg-shaped rather than kettle-bottomed, her stem has about ten degrees more rake, or, in other words, she has a more slanting prow than the *Discovery* and a rounding form that can nowhere be grasped by the ice.

There is little to add to the brief description of the vessel that was printed in the BULLETIN for April (p. 220). It may be noted, however, that the beams and bracing of the sides to resist pressure are unusually massive, and the vessel is filled in almost solid for ten feet back of the bow, where it meets the impact of the ice.

The rudder is so adjusted that it may be lifted out of danger from contact with the ice, the stem and bows are armoured with heavy plates of steel, and the outer planking is protected by a 2½-inch course of greenheart ice-sheathing. The vessel has a three-masted schooner rig, carries fourteen sails, and has a sail area somewhat less than that of a three-masted coasting schooner of the same size. Her gross registered tonnage is 614 tons and her maximum load displacement is about 1,500 tons.

Peculiarities of the machinery installation are: a compound engine of massive construction; an unusually heavy shaft of forged steel, 12 inches in diameter; a massive propeller, 10½ feet in diameter but with blades of large area, which are detachable in case of injury, and extra blades are carried; a triple boiler battery; arrangements for admitting live steam to the low-pressure cylinder, in order to increase the power largely for a limited time; an elliptical cruiser type smokestack, to reduce wind resistance.

The best quality of material and labour have been put into the ship, and it is believed she is the strongest and ablest ship ever built for Arctic exploration.

On Thursday afternoon, July 6, a large number of ladies and gentlemen, on the invitation of the Peary Arctic Club, took a trip on the *Roosevelt* down the bay as far as Fort Wadsworth and back to the anchorage. All the shipping in the harbour saluted the new Arctic steamer, and the whistle of the *Roosevelt* was in constant commission replying to these courtesies. The guests had ample opportunity to look around the little vessel. They could easily see that the vessel had been built for the sternest utility, that not a cent had been used for ornamentation, and that all thought and energy had been given to making her staunch in every timber and comfortable for the men.

The deckhouse amidships has small rooms for the commander and officers, besides kitchen, dining-room and chart-room, with a few bunks in the passageways. The wheel is on the roof of this cabin forward, the crow's nest is at the top of the central mast, and the quarters of the crew are in the forward deckhouse. Some of the guests went down into the hold to get a better idea of the remarkable system of beams and braces that would seem to render the vessel practically uncrushable.

The guests were received by commander and Mrs. Peary as they came aboard, and refreshments were served during the four hours of the sail. Among those present were Rear-Admiral J. B. Coghlan and Mrs. Coghlan, Brig-Gen. F. D. Grant, Henry G.

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Bryant, President of the Philadelphia Geographical Society, Prof. William Libbey, of Princeton University, Madison Grant, President of the New York Zoölogical Society, Prof. Angelo Heilprin, of Philadelphia, Col. David L. Brainard, of the Greely Arctic Expedition, Amos Bonsall, sole survivor of the Kane Expedition of 1853–5, Dr. Henry M. Leipziger, Supervisor of the New York Free Lecture Course, and Mr. Banyer Clarkson and Mrs. Clarkson.

MAPS: THEIR HANDLING, CLASSIFICATION, AND CATALOGUING*.

BY

THOMAS LETTS,

Map Department, American Geographical Society.

It has appeared to me that a presentation to this Congress of the methods adopted by the American Geographical Society in its map-room, and the reasons for their adoption, might prove interesting, if not instructive. There is no intention or desire to urge upon others the plans which we find practical, as we are fully aware that in the internal organization of any institution there may be causes at work to prevent or to modify the use of systems otherwise desirable.

Most librarians receive their maps in three broad groups, *i. e.* (1) flat sheets *unmounted* (as issued by private firms or Government institutions); (2) *folded*, either with or without protecting covers or cases, mounted on muslin or cloth, and sometimes dissected or cut up into sections, allowing them to be folded without detriment to the map; and (3) on *rollers with ledges*, generally mounted or backed with muslin, sometimes without either mounting or rollers, but at any rate as roller or rolled maps.

Reverting to the subject of Classification, it may be conceded that the choice of a system—numerical, alphabetical, chronological, or topographical—is only a matter of personal preference, so long as the catalogue entry corresponds with the map.

There are several very distinct groups into which sheet maps may be divided: 1st, the general collection of individual maps; 2nd, sets of sheets on a uniform scale of a country, a county, parishes, cities, or towns, bearing their own series of numbers and

* A paper read before the New York meeting of the Eighth International Geographic Congress in September, 1904.

system of identification, such as the various surveys of the Ordnance Maps and Plans of Great Britain and Ireland, Germany, France, Italy, Russia, etc.; 3rd, Charts (on varying scales) as issued by nearly every European maritime country; 4th, maps periodically issued by Government or by private publishers of given areas of country or groups of countries, as the beautiful map of Eastern Asia now being produced by the French "Service géographique de l'Armée" on the scale of 16 miles to the inch; and others, which will doubtless be known to you; 5th, Atlases also published in parts and extending over many years (as Stieler's Hand-Atlas), which are always kept by themselves, and are not mixed up with the countries or parts of countries to which they geographically or politically belong. For these we retain the system of identification provided by their producers, as nothing would be gained by departing from such arrangement. Inasmuch as the individual map in every good atlas has a card for itself with its proper reference number, it can readily be found, whether unbound or bound. The effort should be to place the map before the reader in an easy form for reference, and this does not favour the binding of sheets in a book, which is not so convenient for consultation as the flat or sheet form. With these principles, therefore, to guide, sheet maps are arranged in manilla paper wrappers chronologically as regards a particular country, alphabetically as regards the subdivisions of it; and all the countries of a continent are grouped together in A B C succession: thus the whole Continent of America, North America, and Canada occupy tier No. 1 of our sheet cases, whilst No. 2 is assigned to the United States in general, followed by each State in A B C order; with Mexico and the West Indies in their place.

Now, in the handling of a sheet map, it is desirable, as far as possible, to avoid folding it. Every time a folding map is opened and closed it is weakened, and at last it cracks at the folds. It is obvious economy to have the map cut at the fold and a linen joint pasted up the back. This does not prevent the most critical examination of the finest workmanship, while it undoubtedly lengthens the life of the engraving.

Our cases or boxes for holding the sheet maps are made as long and as deep (from back to front) as can be conveniently handled. Their internal measurements are: 41 inches in length by 27 inches deep (from back to front), and the height is 3 inches. The case is laid on a sliding frame, and, once in place, it is not moved. It is opened by raising a hinged five-inch lid, which allows the front to fall and leaves the box open. This arrangement gives the

lightest possible receptacle with the greatest strength in the only part used—the hinge. It is found that a tier of eight cases provides a good working top at a convenient height from the floor.

The particular pattern of case used has been found thoroughly satisfactory in meeting all requirements—viz., facility of handling with a minimum of friction, and a practical immunity from dust. Such a case has long been a desideratum in every office where maps and plans have to be preserved; and the evils attendant on the old methods of open shelves (sliding or fixed), drawers (with or without spring backs), curtains or other devices for dropping fronts (as recently introduced into the Library of Congress), portfolios of any kind (on movable racks or otherwise), need no more trouble the long-suffering mortal who has the care of maps, plans, or prints of any kind.

Of all forms in which printed documents can be presented to us that of the bound book is undoubtedly the most convenient for consultation and for storing, and the nearer we can bring our maps to that condition the better for the reader, the librarian, and the map itself. All probably know from experience how difficult it is to keep track of sheets of paper, prints, drawings, plans, or maps. Maps should be dissected and mounted to fold as books; they can then be handled as books, and need no special section of the map room to contain them. In like manner, if this class of map is presented to the library, preserve it as it is given, and do not throw away its case and lay the map amongst your sheet stock.

With regard to rollers or rolled maps in any form, the system which most recommends itself is the following: Enclose and cover at top and front a long strip of wall, 12 inches deep from back to front, and of length to suit requirements; about 14 inches from the floor have a wooden framework, made in the nature of a bottle-rack or umbrella stand in divisions of 12 inches square or thereabouts, and above it about 42 inches from the floor another framework of the same dimensions, but with the front opening on central points, to enable the rollers to be placed (not lifted) in or out.

These divisions can be made to answer to one or more letters of the alphabet, and the maps can be kept strictly in A B C order, as in the catalogue (and not according to countries, as the sheet maps); the quantity required being too small to justify the topographical arrangement.

Our Society has adopted the chronological system, making the date or year of issue the main guide for arrangement. This may be illustrated by the boxes devoted to the State and City of New

York. Maps of the State, or large divisions thereof (not specifically named) are placed in chronological order and marked in pencil on the bottom right-hand corner with a date (an arbitrary one, if none can be found, and of course the same date on the card), and laid in one or more folios in strong manilla paper (averaging not more than 25 sheets, or equivalent thereto in a folio, a single map folded in half being counted as two), the outside of the folio marked to agree with the chronological contents, as 1670–1720. These are arranged with the oldest date at the bottom. If two or more maps bear the same date, descriptive information is added (as the name of the publisher or compiler).

It is a good plan to place the date in bold figures in the centre of the wrapper. No matter how many maps are added, the chronological arrangement can always be preserved, without alteration of the card, until the box is filled.

Medium collections of maps of counties, townships, or cities are arranged primarily in alphabetical and then in chronological order, so that Albany City, Albion County, Black River Canal, Black Rock Village, and Buffalo all follow one another in the folio, and if there are two or three different dates to any subject, they are then arranged chronologically, the newer editions being at the top. In such a case as New York State, the City of New York has one or more folios to itself, and they are catalogued by themselves.

In taking up the subject of "Cataloguing," it must be said that cards with printed guides are admirably effective as compared with the older blank cards, which called for no analysis of essential particulars.

In practice the printed cards have been found advantageous by confining the special information desired to particular spots on the card. The top line is left blank for the insertion of the name of the map or subject and the section or shelf to which it is assigned. The next four lines have been found sufficient to give the exact title, or such general description as will complete identification (in the absence of a title). Then follow the place, the publisher, and lastly the date. Now many maps give none of these particulars, in which case they must be supplied within brackets and with interrogation marks; above all, a date of some sort must be given, as the whole plan of the system is based upon the chronological arrangement.

As to the question of size. This is a matter of great importance for identification and definition, and it should not be left open to

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question. The British Museum Catalogue of Maps omits size altogether. The Catalogue of the Library of Congress says "the measurements of the maps are in inches;" but, as a matter of fact, it does not say whether the measurement reads first horizontally or perpendicularly; nor does it say whether it includes the border, and consequently no correct mental picture of the map can be formed. The Catalogue of the British Admiralty Charts gives a table at the back of the title-page, wherein are shown the abbreviations used for recognized sizes of paper, with their measurement in inches; but nothing is said as to how much of the paper is covered by the printed map; though, as a matter of fact, very little margin is wasted by the Admiralty.

The Catalogue of the United States Hydrographic Office (which supplies specially-engraved copies of the charts of all nations for waters not within the jurisdiction of the United States) gives no indication of size; whilst the United States Coast and Geodetic Survey gives "Size of border—inches," but, unfortunately, adopts no uniform rule in its measurements, the first figure sometimes referring to the width across, and sometimes to the height from top to bottom.

A catalogue description should be as concise and as correct as possible, and the facts given should be those best calculated to enable the consultant to identify the map by the description. In our Society's catalogue the measurements always mean the map within the border, and they are to be read horizontally first (as we ordinarily read) and then perpendicularly. To emphasize this we affix to the measurements the arrow-heads used on surveyors' and architects' plans → ↑ .

In preference to the metric system we have adopted inches for our standard, as more generally understood by our readers.

If the matter of size is important, the subject of "Scale" must be regarded as the most vital feature of any map or chart; and yet even this has not been uniformly adopted in the British Museum Catalogue, or in that of the Library of Congress; though all three Catalogues of Charts, to which I have already referred, do state very clearly on what scale their work is engraved. The house of Perthes, in Gotha, was probably the first to mark on the table of contents the scale, not only of the main map, but also of the inset or subsidiary plans or maps, and it is only now that other publishers are adopting the plan. It was a matter of considerable discussion as to what principle should guide us in the expression of scale; and while we finally adopted the interchangeable unit of miles to the

inch, or the inch to the statute mile of 69½ to one degree for maps (and the nautical mile of 60 to one degree for charts), we think it not unlikely that countries which do not use the English language and measurements will prefer the fractional or decimal system of the proportion which the drawn map bears to nature; as $\frac{1}{63360}$=1 inch to the mile; or 1:63,360, an equation intelligible to the scientific of all nations.

Returning to the card. After the word "Engraved" we add the words "on copper, wood, stone, steel, by wax process," as the case may be; and, when possible, the name of the engraver is added, as in the older maps that is often the only means of identification. If the map is a copy of a manuscript, or one produced by photo-lithography or zincography, the fact is noted. Nearly all maps are primarily issued plain or uncoloured, so that the printed word "plain" suffices to state the normal condition of the map; if, on the other hand, the map is coloured, the words "by hand," or "printed in colours" are written in. The last line of all usually stands as printed, but frequently we add the sheet No. (as in a series of charts), or folio No. if in an atlas, or mark it out and indicate the form in which the map is in stock, as "muslin, dissected to fold," "roller and varnished," etc.

The subject here outlined will be found treated *in extenso* in an article published in the Library Journal, Vol. 27, 1902, pp. 74–76.

GEOGRAPHICAL RECORD.

AFRICA.

THE MASAI TO BE PLACED ON RESERVES.—It will interest all who remember that the great African steppe between Mount Kilimanjaro and the Rift Valley remained unexplored for many years because of the wandering Masai herders, who regarded all strangers entering their country as enemies, to hear that this superior people have so completely yielded to the British influences now predominating that they have consented to give up a large part of their territory and settle on reservations that have been selected for them. Sir D. Stewart was sent to East Africa, under instructions from the Secretary of State for the Colonies, to make full inquiry into the Masai question. Meetings were convened at which the British officials and the chiefs of the various branches of the Masai tribe were present. The result is that, with the unanimous consent of the chiefs, special areas are to be reserved for the tribe.

The northern and larger section of the Masai have agreed to vacate the Rift Valley and settle in only a part of the area they have so long occupied. Another region farther south has been assigned to the rest of the tribe. The boundaries of the reservations have been distinctly defined, and are now being marked out. A

Government station will be built in the northern reserve, where an officer, specially selected as a person who is acceptable to the Masai, will reside. The tribe will remove to their new settlements as soon as the necessary preparations are completed, and the extensive pastures vacated by them will then become available for European occupation.

DECLINE OF THE NIGER DUE TO FALLING WATERS.—The French explorer Fourneau says that the Niger is now showing more evidences of the desiccation that is gradually spreading over large parts of Africa than any other large river. It is the run-off for the waters of a great part of the western Sudan, where the decline in rainfall has been uncommonly marked for a considerable period.

The French officers Toutée, Hourst, and Fourneau proved the possibility of carrying supplies from the mouth of the Niger to the upper river, in spite of the long stretch of rapids about 500 miles above the delta. Hundreds of tons of freight have thus been distributed from the ocean among French posts in the western Sudan, and as late as last year some supplies were still forwarded by this route; but this highway to inner Africa, hailed as a great discovery when the French declared its practicability, has been abandoned this year. The water is so low in the rapids that no boat can get over the rocks.

At Timbuktu the French report that the water-level is slowly but steadily sinking. This is very apparent among the islands that divide the Niger into many channels from 100 to 300 miles above Timbuktu. As long as we have had knowledge of these islands some of them have been completely covered at high water, so that the native inhabitants have been compelled to make an annual sojourn on the mainland till the fall of the floods. Not a single island is now abandoned, for none of them is covered even when the flood is unusually high.

Fortunately for the French, they have completed their railroad from the Senegal River to the upper Niger, giving a new inlet to their Sudanese possessions.

THE BRITISH ASSOCIATION IN SOUTH AFRICA.—The meeting of the British Association in South Africa, late in August and early in September, will be especially notable as the first meeting of a European scientific body in South Africa. It will be the seventy-fifth assembly, and under the presidency of Prof. G. H. Darwin. The programme will involve a great deal of travel in that part of the British Empire, for the meetings are to be held in seven widely-separated centres, to say nothing of the excursions. The sessions will be held in Cape Town, Durban, Pietermaritzburg, Johannesburg, Bloemfontein, Kimberley, and Bulawayo, and arrangements are being made in each place for receptions and excursions.

The officers and invited guests will number about 200, and many of the ordinary members are also expected to attend. The meeting will be opened at Cape Town on Aug. 15, when the presidential address will be delivered in the evening. The session there will last four days, shorter visits being made to other cities. A limited number of the members will make the journey from Bulawayo to the Zambezi to visit the Victoria Falls. Mr. G. W. Lamplugh is going to the Falls in advance to study the question of their geological formation, and it is likely that he will present a paper on the subject before the Geological Section. A party of specialists will also make an excursion to the ancient ruins of Zimbabwe.

Nature says that the South African Association for the Advancement of Science is preparing a handbook which will be a general review of the various branches of scientific activity in South Africa, the articles being contributed by actual workers in these subjects in that country. A copy of the book will be presented to each member of the British Association before leaving England.

THE ISLAND WORLD.

CELEBES JOINED WITH THE OUTER WORLD BY CABLE.—The German newspapers announce that the cable steamer *Stephan* has completed the laying of the cable between Menado (at the northern end of Celebes), Yap (at the west end of the Caroline group), and Guam. The German-Dutch Telegraph Company of Cologne owns the cable. Its length is nearly 2,000 miles, and the greatest depth attained was 2,300 feet. Menado and Macassar, the one in the northern and the other in the southern peninsula, are the two largest marts in Celebes. Menado is situated in one of the richest and best-cultivated districts of the Dutch East Indies, and has become prominent with the growth of the coffee industry, which was not introduced into the island until 1822. Yap is the most important island in the Carolines (German), and the collecting and distributing point for the trade of that group. The fact that those parts of the Pacific are now connected with the American line, giving them telegraphic communication with the rest of the world, will end their isolation and give an impetus to their development.

NEW ISLAND IN THE PACIFIC.—A few more particulars have been received concerning the new island that suddenly came into existence in the Pacific late last year, as briefly reported in the newspapers in January. The island has been named Nii Shima, and it stands in the small group known as the Volcano Islands, a little south of 25° N. Lat. and east of 141° E. Long. Its growth and the disquieting phenomena that accompanied it were watched by the natives of the islands Iwo and Sulphur, who did not pretend to enjoy the violent spectacles they witnessed.

The island, which is one of the latest accessions to the Japanese empire, is said to be 480 feet high and 2¾ miles in circumference. The first intimation of something unusual occurred on Nov. 14, when the natives above mentioned heard strange rumblings that they could not account for. Two weeks later clouds of black ash and steam, or, as the natives said, of black-and-white smoke, filled the sky to the east, and the sea looked to them as though it were on fire.

When the smoke partly cleared they saw what they thought was an island about 12 miles away. A little later there seemed to be three islands, and on Dec. 12, instead of three islands, one large island was plainly in view. It changed its form to some extent from day to day, and the spectators were anxious to know what would happen next. Finally, ten men summoned up sufficient courage to set out for the new island in a 30-foot boat and a canoe.

They reached the island on Feb. 1. They reported that the south coast was a precipitous mass of rock and they were unable to land there. The slope was gentle on the north, and they found there a boiling lake. They succeeded in reaching the top of the island and planted a flag with the inscription: "New Place. Great Japan. Many Banzais." The new island stands on the line of weakness in the earth's crust that is marked by volcanoes all the way from Fiji to the Bonin Islands.

A VISIT TO THE PEOPLE OF A LITTLE-KNOWN ISLAND.—Mr. Walter E. Roth, an ethnologist of Brisbane, Queensland, and also the Government Agent having supervision of the native tribes of that State, has recently visited Mornington Island, which lies about 30 miles from the southern coast of the large, shallow Gulf of Carpentaria, off northern Queensland. The fact that this island, which is about 35 miles long and from 10 to 18 wide, has never been explored is due to a number of circumstances. The island was discovered 103 years ago by Captain Flinders, who named its leading promontory Cape Van Diemen. A number of small islands are scattered around it, and years ago the British gave the name of Wellesley

Islands to the whole group and called the largest of them, which is also one of the larger islands of Australia, Mornington Island, after the second title of the Marquis of Wellesley.

The best maps show the outline of the island, but give no indication of its topography except to print through the middle of it the words "About 300 feet high." It remained cut off from the world's interests because it stands at the bottom of a great gulf hundreds of miles from the shipping that passes through Torres Strait and equally distant from the nearest enterprises in Australia. The neighbouring coasts of the mainland are very swampy, and Leichhardt is the only Australian explorer who ever came within 50 or 60 miles of it. The gulf is so shallow that large vessels cannot navigate it; and as there seemed to be no commercial prize in view, the island was left in its isolation entirely outside the current of the world's affairs.

The natives of northern Australia reported, about 15 years ago, that a black from the island had come to them on a rough raft made by lashing small timbers together. They understood his dialect with difficulty, but got the idea that many persons lived on the island. He soon returned to his home.

According to the Brisbane newspapers, Mr. Roth has returned from a visit to the island, and says that the people, perhaps 500 in number, whom he met there, have apparently had no intercourse with the outside world for many generations. They have forgotten most of the rude arts their fathers may have brought from the Australian mainland, and are inferior in their conditions of life to the continental aborigines, of whom they are evidently an offshoot. Mr. Roth found the coast lands very swampy, and apparently did not penetrate far into the island. The natives fled at his approach, and it was only by patient diplomacy that two of them were finally induced to enter his camp. Others came in gradually, and at length about 200 were grouped around the visitors.

Through natives he had brought with him Mr. Roth was able to have a little conversation with the islanders. He found their way of life very primitive, even as compared with that of other Australasians. They are skilful in the use of their boomerangs and wooden javelins, but are far behind all the other natives of islands in that part of the world in the art of navigation. Their boats are nothing but the rudest log rafts, propelled by poling or paddling. They wear no clothing of any description. They live out in the open without even the most rudimentary shelter, and when protection is at times necessary they content themselves with making heaps of more or less dry vegetation, into which they crawl. They have no idea of the art of plaiting, and therefore lack the baskets in which many savage folk carry food and other articles. They transport their belongings by tying them up in bits of bark.

They live entirely on wild fruits, fish, and game, and have apparently not the slightest conception of agriculture. They are good hunters and fishermen, and know the use of fire in cookery, producing a blaze by the friction of two pieces of wood. These poor people seemed to Mr. Roth to be very simple and child-like, and showed no evidence of treachery or malice, but they were easily frightened. They were somewhat alarmed when the white man lit his pipe, and begged to know why he had set his mouth on fire. Many tin whistles which were distributed among them gave so much entertainment that, when the supply gave out, a few parents offered children in exchange for these musical instruments.

POLAR.

ARCTIC CRUISE OF THE DUC D'ORLÉANS.—Having chartered the *Belgica*, and secured the services of Captain Gerlache to command the ship, the Duc d'Orléans

and his party left Sandefiord on May 6 for Bergen and Shannon Island, off the east coast of Greenland. The party intend to spend the summer cruising in the Arctic Ocean, between Spitzbergen and Greenland, and to carry on some oceanographic studies. It is not the intention to winter in the Arctic, though the vessel is provisioned for the unexpected contingency of being detained next winter by the ice conditions. The Duke will visit Shannon Island to see if the members of the Ziegler Expedition reached that place, where a depot of provisions had been left for them in case their fortunes should lead them to or near the east Greenland coast. If he should find the members of the party they are to return with him to Europe. The Duke's party includes a number of French scientific men and Norwegian sailors. If all goes well the *Belgica* is expected to return in September.

Some Results of the British Antarctic Expedition.—Five papers by members of the *Discovery* Expedition, printed in the April number of the *Geographical Journal*, sum up in a preliminary way the leading results of the two years' work, and include facts of value that had not hitherto been made public. The general geography of the Victoria Land region is treated by Captain Scott; the physical geography by Mr. Ferrar; meteorology by Lieut. Royds; seals and birds by Dr. Wilson; and the marine biological collections by Mr. Hodgson. A paper is also contributed by Capt. Colbeck on the Antarctic sea-ice. In this paper he includes a discussion of the observations made by the *Southern Cross* Expedition in 1898–1900, and by the relief party in the *Morning* in 1902–4.

Among the chief problems were the remarkable ice conditions, described by Capt. Scott and Mr. Ferrar, which are certain to attract much attention among physical geographers. Capt. Scott says that though there are innumerable glaciers on the coast of Victoria Land, most of them merely discharge local névé fields lying in the valleys of the coastal ranges. Very few run back to the inland ice, and these may be divided into two classes—the living and the dead. In the long stretch of coast between Cape Adare and Mount Longstaff, over 11° of latitude, there appear to be only four living ice discharges from the inland.

He says that the Ferrar glacier is typical of the dead glaciers. The ice in the valley is practically stationary and gradually wasting away from the summer thawing. This glacier probably contains as much ice as any hitherto known, and the Barne and Shackleton glaciers contain a great deal more. They are now in a greatly diminished state, and it is interesting to think what vast streams of ice they must have been at their maximum.

Capt. Scott submits the conjecture that the inland ice once stood from 400 to 500 feet above its present level. He also says, referring to the Great Barrier, that its edge, sixty years ago, was in advance of its present position, in places as much as 20 or 30 miles.

Many other facts given seem to confirm these generalizations, and, taken with the moraines and erratics seen by Mr. Ferrar and Dr. Wilson high above the present level of the ice-sheet, go to show that "the majority of curious and often vast ice formations met with in the Ross Sea must be regarded, not as the result of present-day conditions, but as the rapidly-wasting remnants of a former age."

These facts are believed to prove beyond doubt that the ice in at least this part of the Antarctic regions is in a state of fairly rapid retreat, and it is known that the same thing is happening in the Arctic regions. It is very significant that Dr. Otto Nordenskjöld, in his recent book, reports a similar retrogression of the ice masses in West Antarctica, as the Graham Land region is now called.

Mr. Ferrar reports that denudation is at present playing a comparatively unim-

portant part in determining the features of the landscape. The Royal Society Range, indeed, shows some rounded rock surfaces, due to the grinding of ice or of the rock matter carried along by ice, but no evidences of similar "ice work" were seen near winter quarters. The splitting of rocks, due to the percolation of water, which expands on freezing, is at present the most important factor in the denudation of the land.

The geological study of the Royal Society Range, a little inland from the winter quarters, showed a gneissic platform, probably of Archæan age, and above it in order are granites of two ages, and sandstone 2,000 feet thick, with basalt capping the sandstone, the whole forming plateaux that have been dissected by denudation, and probably also broken up by faulting. At the base of the basalt is a thin carboniferous seam not more than an eighth of an inch in thickness. It was agreed that this seam must be due to vegetation, but the plant remains could not be identified.

Dr. Wilson records that the Weddell seal is more often met near the land than any other. He thinks there is little prospect of a profitable Antarctic seal fishery, though there is an increased demand for the skins of the hair seals; but these skins rarely escape defacement by the wounds inflicted by the killer whale.

Mr. Hodgson reported on the biological collections that everything goes to show that animal life is very abundant in the southern seas, and the Ross Sea is still an exceedingly rich area for the biologist. The large collections of the *Discovery* are now in the hands of experts for description. The three voyages of Capt. Colbeck have convinced him that ships going south for geographical work during the summer should enter the pack between 178° and 180° E. Long. as early in December as possible, the ice there being lighter and more open than elsewhere.

GENERAL.

Deforestation and Climate.—Whether forests have an important influence upon climate is an old question which has not yet been satisfactorily settled. Dr. Hennig gave an address on the subject before the May meeting in Berlin of the German Meteorological Society, in which he claimed only that dense forests favour moisture and prevent the drying out of soils to a considerable extent, and adduced a number of coincidences where the depletion of the forests appears to be attended by drier conditions. According to Consul-General Günther, of Frankfort, who has summarized the address for the *Consular Reports*, Dr. Hennig said that the climate of Greece, where to-day only 16 per cent. of the area is covered with forests, has become drier. An increase of temperature and decrease of rain are noted, as compared with ancient times. This is especially noteworthy in Attica, which was thickly covered with forests about 3,000 years ago, and where hardly any rain now falls; while the heat in the open air attains a degree of intensity that would make the indulgence in athletic sports, once famous, now almost an impossibility.

Similar conditions exist in the Peninsula of Sinai, where thousands of years ago the people of Israel found a luxuriant and fertile country, though to-day it is a desert. Palmyra, also once a flourishing oasis in the Syrian desert, presents to-day only a waste of stones and ruins. In Mexico, where the Spaniards cut down the forests in the mountains, droughts changing to devastating floods are now noticeable, especially in the neighbourhood of the City of Mexico. In Algeria, where, since the middle of the last century, the forests have been cut down on a large scale, dry weather has increased; and in Venezuela the level of Lake Tacarigua, to which Alexander von Humboldt drew attention, has been lowered in consequence, it is said, of deforestation.

THE CENTENARY OF DON QUIXOTE.—Under this heading the *Boletín* of the Royal Geographical Society of Madrid presents the second (enlarged) edition of a work first printed in 1840, under the title of *The Geographical Skill of Miguel de Cervantes*, by Don Fermin Caballero, supplemented by two later writings of his—one, *The Country of Don Quixote*, the other, the *Map of the Field of Montiel.*

A short paper on the *Geographical Knowledge of Cervantes*, by Don Cesáreo Fernández Duro, serves as an introduction to the others.

All these may be read with pleasure, if not with conviction. Men will continue to find what they look for in Cervantes and Shakespeare, and too often without the saving grace of humour to keep them within bounds. A plate designed by Señor Caballero, with the inscription, *Miguel de Cervantes Saavedra occupying his place among geographers*, shows the globe in the centre, with the name Cervantes across it and the names of forty-eight geographers distributed in the spaces between lines radiating from the globe.

The fitting comment on such extravagance is the famous line,

Voto á Dios que me espanta esta grandeza.

OBITUARY.

PROFESSOR ÉLISÉE RECLUS.—Scientific men all over the world will learn with the deepest regret of the death of Élisée Reclus, who will always be remembered as one of the great geographers of the nineteenth century. His death occurred at Brussels on July 7. He had been Professor of Geography at the University of Brussels since 1894. He was born at Saint-Foy-la Grande, Gironde, in 1830, and laid the foundation of his geographical education under the guidance of Karl Ritter, with whom he studied for several years at the University of Berlin. Soon after the close of his school studies he travelled widely in Europe and America, practically applying the principles he had acquired by six years of geographical field study, which, in the Western world, was extended over the United States, Central America, and parts of South America. He wrote a number of articles in French reviews on the results of his studies abroad.

His socialistic ideas were held in France to be dangerous, and when, in 1871, he published a very severe arraignment of the French Government and cast his lot with the insurgent National Guard, he was kept a prisoner for some time, and finally sentenced to be transported for life to New Caledonia. The scientific men of many countries protested against the imposition of this terrible penalty, which would end the usefulness of a great geographer and be a distinct loss to science. As a result of this protest the sentence was modified to banishment, and most of the remainder of Reclus's life was spent in Switzerland and Belgium. He was, however, permitted to return to France when amnesty was extended to all the Communists in 1879, but later he was condemned at Lyons as an associate of Prince Kropotkin, the distinguished Russian geographer, in the organization of an anarchist movement, and he escaped arrest only by again taking refuge in Switzerland.

While in Switzerland he began the composition of his monumental work, the "Nouvelle Géographie Universelle," which was translated into English under the title of "The Earth and its Inhabitants." The work, published in parts as he wrote it, contained about 3,500 maps and many other illustrations. It was a treatise in nineteen large volumes on the geography of the earth and the social and economic development of its inhabitants. This work, the result of the enormous labour, the rare knowledge, and geographical gifts of its author, though not wholly free from error, and not accepted in all its statements and theories, has been justly regarded as

one of the greatest of geographical productions. Its preparation occupied twenty years of the author's life. Reclus revisited the United States in 1891 to collect material for his volume on this country. The last to be written were the two volumes on South America, and at the conclusion of the work Reclus wrote "A Parting Word" to his readers, in which he said:

> I may congratulate myself on the good fortune by which, in the course of a life not lacking in stirring incidents, I have been enabled to fulfill my engagements of regular publication without ever once breaking faith with my readers.

Reclus was endowed with rare scientific qualities, and possessed a literary gift that interested most readers in all that he wrote. This happy combination made him one of the most widely read of geographers.

THE BIBLIOTECA NAZIONALE CENTRALE of Florence announces, under date of June 8, the death of Comm. DESIDERIO CHILOVI, its chief Librarian for the past twenty years.

THE ROYAL BOHEMIAN SCIENTIFIC SOCIETY, of Prague, reports the death, on the 12th of June, in his 88th year, of W. W. RITTER VON TOMEK, the oldest member of the Society, and for many years President of the Imp.-Royal Government Council.

WILLIAM ZIEGLER.—Mr. Ziegler died at his summer home in Connecticut on May 24. He had been in excellent health until the previous November, when he was thrown from his carriage and severely injured. Born in Beaver County, Pennsylvania, in 1843, he made his own way, soon developed remarkable talents for business, and, before reaching middle age, accumulated a large fortune. He became known to geographers about five years ago through his zealous promotion of north polar explorations under his own management and solely supported by him. His desire was that the North Pole should be reached by one of his expeditions, and he was willing to spend money without stint to achieve his ambition.

He chose the Franz Josef Land route for his attack on the Pole, in spite of the fact that it had not recently been viewed with much favour. His first expedition, commanded by Mr. Baldwin, reached Franz Josef Land in 1901, but failed to make any important northing, and returned in the summer of 1902. In 1903 the second expedition under Mr. Fiala started north, and succeeded in getting into the heavy ice of Barents Sea, where it is possible their ship may have drifted to Franz Josef Land; but nothing has been heard from the party, as the relief expedition of 1904 was prevented by the ice from getting north. At the time of his death Mr. Ziegler had just completed arrangements for this year's relief expedition, which started from Norway late in June on the *Terra Nova*, in charge of Mr. W. S. Champ. It is said that Mr. Ziegler instructed the executors of his estate to continue the work of his polar expeditions.

NEW MAPS.

AFRICA.

AFRICA.—Map of Africa. Scale: 1,000,000, or 15.7 statute miles to an inch. Sheet 71 (Monrovia). Intelligence Division of the War Office, London, 1905.

Includes most of Liberia, and a part of the Ivory Coast. A note says that, excepting the Anglo-Liberian frontier, no part of the area has been surveyed, and the positions of villages, rivers, and hills are only approximate. About two-thirds of

the sheet is practically white; still, the naming of the civilized settlements of Liberia in their approximate position is an advantage which, perhaps, this sheet is unique in offering. Cape *Montserrado* is printed instead of the accepted form *Mesurado*, which is certainly found in most, if not all, of the best atlases. The original Portuguese was Monte Serrado.

RHODESIA.—River Zambesi from Zumbo to the Victoria Falls. In 3 Sheets. Scale, 1:250,000, or 3.94 statute miles to an inch. British South Africa Company, London, 1905(?).

The latest information concerning the navigability of the various reaches of the Zambezi comes from Major Gibbons, and the facts reported by him in his recent book are recorded on this map. It was compiled chiefly for the administrative staff stationed in districts near the Zambezi, so that on this large scale they may conveniently place upon it further particulars of the navigability of the river and its tributaries in regions adjacent. This information will ultimately be incorporated with the six-sheet official map of Rhodesia.

RHODESIA.—A map of Rhodesia divided into Provinces and Districts under the Administration of the British South Africa Company. 6 Sheets. Scale, 1:1,000,000, or 15.7 statute miles to an inch. British South Africa Company, London, 1903. Price, £1, 4s.

This is a revision of the official map of the Company's sphere of operations, embracing approximately 750,000 square miles. The revision was very carefully done; and new information accumulates so rapidly in that developing region that the two northern sheets were practically redrawn. Gold fields, reefs and mines, altitudes, roads, railroads, and a large nomenclature are among the features. The large scale permits the introduction of much explanatory matter relating to geology, topography, the fly districts, forest and grass areas, etc. No attempt is made to delineate the surface forms, but this could not be done accurately on so large a scale. For most purposes this is the best map yet produced of this large territory.

TOGO.—Die Umgebung der Station Atakpame. Scale, 1:100,000, or 1.57 statute mile to an inch. By P. Sprigade. Drawn by G. Thomas. *Mitt. von Forsch. und Gelehr. aus den Deutsch. Schutzgeb.*, Vol. 18, No. 2. Berlin, 1905.

Atakpame, a German station in the interior of Togo, lies among hills from 1,000 to 2,000 feet high, forming the water-parting between the Amutshu and Atalo Rivers. These hills overlook a very fertile and populous farming region, and this sheet distinguishes it as one of the best-mapped districts in tropical Africa.

It is based upon the ascertained position of Loboto, one of the points in Plehn's triangulation of central Togo, and upon much other work with theodolite, compass, and chain, the result being an accumulation of accurate topographical data which could not adequately be expressed on a scale of 1:200,000, which is the scale of the map of Togo, now far advanced. Double this scale was, therefore, adopted for this sheet, which contains a most unusual amount of information for an African map. We see the wide-built roads, the bridges, the causeways over the swamps, native paths, Government and mission stations, camping grounds, and other cultural features in their relation to the topography of the entire region. There are a large number of place-names, with the number of huts in each settlement, the width of the streams at various parts of their courses, and the position of the native markets, often at a considerable distance from villages, or even houses. A special map of Togo on a scale of 1:100,000 (about forty sheets) will probably not be long delayed, as the cartographic material that the German officials have collected cannot be satisfactorily used on a much smaller scale.

XUM

AMERICA.

NEW JERSEY.—Geological Survey of New Jersey. Scale, 1:63,360, or one statute mile to an inch. Revised Edition of the original Survey of 1882 and 1883. Sheets 22, 23, 24, 26, 27, 28, 31, and 32. Contour interval, 10 to 50 feet. Henry B. Kümmel, State Geologist; C. C. Vermeule, Topographer. Trenton.

These eight sheets are the first to be issued of the revision of the Topographic Atlas of New Jersey. At the beginning of 1903 some of the sheets of the Atlas were out of print, so that new editions were necessary. This fact gave opportunity for extensive revision of the sheets, which were especially in need of correction in the neighbourhood of the more important cities. The necessary field revision and the preparation of the new maps have occupied much of the attention of the topographic force since early in 1903.

Eight of the seventeen sheets in the series have now been issued, and the complete set will be numbered from 21 to 37 inclusive. They will take the place of the old sheets 1 to 17.

In large part, these revised sheets cover the same territory as those which they supplant, but one important change has been made. The old sheets overlapped, but many purchasers thought that sheets which did not overlap, but were matched edge to edge and arranged in tiers across the State, would be preferable. The new sheets are in accord with this suggestion.

NEW JERSEY.—Topographic Map of New Jersey. Scale, 2,000 feet to an inch (Dover-Stanhope, Boonton, and Chester Sheets). Contour Interval in level country, 10 feet; in hilly country, 20 feet. Geological Survey of New Jersey, Trenton, 1905.

The area represented by these three sheets was resurveyed in 1904. The original topographic survey of the State was completed in 1887 and the resurvey was begun in 1898. The new map of which these sheets are a part was needed, because the rapid extension of city streets, railroads, new townships, political boundaries, mining information, etc., could not all be well laid down on the scale of the old survey. The scale of the new maps is about two and a half times that of the maps of the old series. The work is progressing slowly, but the larger scale permits many additional details and corrections and a more accurate delineation of a large variety of facts than could be shown on the one-inch scale. It will be used for many purposes in preference to the one-inch map, but cannot supplant the revised edition of the latter, now in progress, for general atlas use.

UNITED STATES.—Geologic Atlas of the United States. No. 121. Waynesburg, Folio, Pennsylvania. Washington, 1905.

The quadrangle is well within the great Pittsburgh coal field on one of the Allegheny plateaux. The stream valleys are narrow, the slopes steep, and the hill tops have no extensive levels, so that there are only small areas desirable for cultivation, most of the land being used for pasturage.

No. 123. Elders Ridge, Folio, Pennsylvania. Washington, 1905.

This quadrangle is in central-western Pennsylvania, a rural area on one of the Allegheny plateaux where the streams are deepening their channels so rapidly as to prevent the development of broad flood-plains, with the result that good soil afforded by alluvial deposits is not extensive. There are about 30 hamlets in the quadrangle, and Avonmore, the largest village, has a population of about 700.

CUBA.—Carte de Cuba. (No Scale.) *Bull. de la Soc. de Géog. de Lille.* May, 1905.

The facts shown on this map are emphasized by the exclusion of everything else. These facts are: all the chief ports; the east and west trunk line railroad; the railroads

connecting north with south coast ports; the three regions in which tobacco, sugar, and cattle-raising respectively predominate; and the eastern region of forests, mining, and some fruit. Thus the most vital facts relating to inland transportation and the distribution of the leading industries may be readily seen.

MEXICO.—Mexican Railways and Lines of Navigation in 1904. Scale, 150 miles to an inch. In "Commercial Mexico in 1905." Bureau of Statistics. Washington, 1905.

Shows the extension of the Mexican railroad system to the frontier of Guatemala. The names of steamship lines plying on the various sea routes are given.

EUROPE.

AUSTRIA–HUNGARY.—Brionische Inseln. Scale, 1:36,000, or 0.57 statute mile to an inch. *Deutsche Rundschau für Geog. und Stat.* Jahr. 27, Heft 8. A. Hartleben's Verlag. Vienna, 1905.

Showing the results of the topographic survey of seven small islands in the Adriatic near the town of Pola. It is an excellent reproduction from the Government map and illustrates an article on the islands. It may interest some American map-makers to observe that the islands, as shown on this plate, are about 40 times larger than the delineation of them on atlas sheets of Europe, the scale for European countries usually being 1:1,500,000; and yet in the Stieler and some other atlases the two larger islands are shown on the small scale with perfect accuracy in general outline. Of course the minor windings of the coast-lines cannot be drawn on such a scale, and the smaller islands can appear only as dots.

CENTRAL EUROPE.—Phaenologische Karte des Frühlingseinzugs in Mitteleuropa. Scale, 1:3,400,000, or 53.6 statute miles to an inch. *Pet. Mitt.* Vol. 51, No. 5. Justus Perthes, Gotha, 1905.

The map and the accompanying paper were prepared by Prof. Dr. E. Ihne of Darmstadt. In many places throughout Germany and, to a lesser extent, in parts of Austria and Switzerland north of the Alps, the time of the blossoming of a considerable number of plants, including some of the fruit trees, has been observed for years. Dr. Ihne has collected and collated a great mass of authentic information on this subject and gives graphic expression on his map to the distribution of the various periods of bloom in Central Europe. He recognizes five periods, the earliest, coloured yellow, being from April 22 to April 28 in the more sheltered or southerly places, as the Rhine valley south of Cologne, or parts of Austria east of the Alps and south of the Danube; red shows the lands where bloom is still early (April 29–May 5), chiefly in river valleys and in wide parts of France and Belgium where climate is softened by the neighbouring ocean; green shows the medium period of bloom (May 6–12) covering nearly all the low plain of the north, except a wide strip along the Baltic coast of Prussia, and also including some of the plateaux among the mountains of south Germany; violet is spread over the regions where the blossoms come out late (May 13–19), as in the zone along the Baltic and the higher lands that join the mountains of the south with the great plain of the north; and blue covers the narrow areas of very late bloom on the hills and ranges that dominate South Germany.

GERMANY.—Küstenänderungen in Süderdithmarschen im 19 Jahrhundert. By L. Müllenhoff. *Pet. Mitt.* Vol. 51, No. 4. Justus Perthes, Gotha, 1905.

Four maps and a profile illustrating a paper by Prof. Dr. R. Hansen on the changes along the west coast of the Dithmarschen in the neighbourhood of the Elbe estuary. The maps are: Ehemaliger Elbeufer, scale, 7.8 statute miles to an inch, showing the former course of the Elbe extending through the Dithmarschen; Trischen, scale, 1,250 feet to an inch, outlining the coasts of the island in 1874, 1884, and

1894, the land area having been much extended in twenty years; Die fiskalische Süderdithmarscher Küste in 1797, 1854, 1894, and 1904, on a scale of 1.8 statute mile to an inch, indicating great changes in the outline of the coast and outlining the dykes built to protect a part of it; Helmsand, another of the Dithmarschen islands, showing that in a century and a half its area has been greatly reduced. A cross section through the dune on Trischen shows its considerable increase in width and in some places in height in 1895 as compared with 1894.

ICELAND.—Öræfajökull og Skeidararsandur. Scale, 1:200,000, or 3.1 statute miles to an inch. Surveyed by the General Staff, Topographic Division. *Geog. Tidskrift* of the Royal Danish Geog. Soc. Vol. 18, Nos. 1–2. Copenhagen, 1905.

An excellent specimen of the survey work that the Danish Government is now carrying forward in Iceland. It shows the courses of the glacial streams and indicates the topography by contours with an interval of 40 metres.

GENERAL.

EDUCATIONAL MAPS.—The Autograph Hand-Maps. The Oxford Geographical Institute, Oxford, England. Price, 1d.

Outline maps to be filled out in the class-room do not usually show topographic delineations, but the special feature of these maps is the insertion of hill-shading in brown. This should add to their educational value so far as topographic forms influence the distribution of commercial routes, precipitation, and other facts that the student is required to draw on such maps. Thirty-three maps have now appeared in this series, including most of the European countries and the United States. The natural English and metrical scales are given. Some of the world maps are on the equal area projection, or, in other words, a square inch on any part of the map represents the same number of square miles.

MAP SUPPLEMENTS.—Kartenbeilagen. Bearbeitet von Prof. Paul Langhans. A series of 16 map plates in "the Geographen-Kalender," 1905-1906. Justus Perthes, Gotha, 1905.

This year's issue of the Geographen-Kalender contains the usual instalment of supplementary coloured maps illustrating conspicuous events of the past year. They include: The northern part of the Hejaz railroad (which, when completed, will connect Damascus with Mecca), showing the section in operation east of the Jordan, about 250 kilometers, and the parts now building, or in course of survey; the route of the British to Lhasa with the new Indian-Tibetan markets of Gyangtse and Tadum; the completed railroad on the Trans-Siberian Railroad, around the south end of Lake Baikal; the growth of the Japanese Empire since 1875, showing lands appropriated or acquired in war, and also the southern part of Sakhalin, lost by Japan in 1875; the French and British spheres of influence in Siam, with the boundaries between that kingdom and the French and English colonies; the boundary changes in West Africa and the Western Sudan, according to the British-French and French-Portuguese agreements; the region of the German Southwest Africa war, indicating farms destroyed; the development of the United States, 1855-1905 (the compiler of this plate was deceived by legislation pending in our Congress: New Mexico, Arizona, Oklahoma and the Indian Territory are still Territories); the cable line to Alaska and its land telegraphs (the connection between St. Michael and Nome is not submarine cable, as indicated, but wireless telegraph); the new boundary between Bolivia and Brazil; the routes of the Merzbacher and Saposchnikov expeditions among the Tian-Shan and Alai-tagh ranges; the Dutch explorations in Borneo and New Guinea; the search of the *Tacoma* for doubtful islands in the Pacific; the

position of Dalgety, capital of the Australian Commonwealth; the travels of McMillan and Liddell in the basin of the White Nile; French explorations in the Sahara; and the new boundary between Brazil and British Guiana.

BOOK NOTICES.

The Andrew J. Stone Explorations in Arctic and Sub-Arctic America. 38 pp., 52 half-tone Illustrations and 3 black-and-white Maps in Text. 4to. Edition limited to 100 numbered copies, all of which have been distributed. The American Museum of Natural History, New York, 1905.

This handsome brochure commemorates the very valuable results of the collecting and exploratory expeditions of Mr. Stone in the Arctic regions of North America between 1897 and 1904. The generosity of a few persons made it possible for Mr. Stone to attack the zoological problems of northern Alaska and the Canadian northwest, and the outcome should encourage such donations for scientific purposes. His expeditions were rich in contributions to our knowledge of the distribution of the game animals of the high north, and in the correction of the maps of the Arctic coast between the mouth of the Mackenzie and Cape Lyon. Some charted lakes and rivers were found to have no existence, and others that had been overlooked were charted and named by Mr. Stone. He also took many photographs and anthropometric measurements of Indian and Eskimo tribes. Somewhat extended descriptions of his work are given in the *Bulletin* of the Amer. Mus. Nat. Hist., Vol. 13, pp. 31–62, and Vol. 14, pp. 53–68. The brochure contains many beautiful pictures of big game animals collected by Mr. Stone and now mounted at the Museum. His collections during three seasons, 1901–1903, numbered 2,325 mammals and 617 birds, besides many nests and eggs.

Le Mexique au Début du XXe Siècle. Par le Prince Roland Bonaparte, Léon Bourgeois, Jules Claretie, d'Estournelles de Constant, A. de Foville, Hippolyte Gomot, O. Gréard, Albin Haller, Camille Krantz, Michel Lagrave, Louis de Launay, P. Leroy-Beaulieu, E. Levasseur, le Général Niox, Alfred Picard, Elisée Reclus. 2 vols., 394 and 374 pp., many black-and-white maps in the text and 4 coloured maps. Librairie Ch. Delagrave, Paris, 1904. (Price, fr. 30.)

At the close of the Paris Exposition in 1900, M. de Mier, the Mexican Minister to France, conceived the idea of enlisting the collaboration of eminent specialists to write a description of Mexico in her various aspects. He placed before them all the best sources of information, and in less than five years his idea was realized in these two sumptuous volumes. Sixteen men, widely known in their special fields of study, are the authors, and the whole work has been under the editorial supervision of E. Levasseur, who has recently been chosen President of the Collège de France.

It is a beautiful and costly work, superior in mechanical execution and in maps, and each of its seventeen long sections bears the stamp of expert preparation. Some risk, however, is involved in this method of producing a book, and these volumes have not wholly escaped. Some of the topics overlap, and there are several instances of inconsistency in the facts given by different authors. Some statements, also, are likely to be disputed; and, in fact, two or three not very vital remarks by Prince Roland Bonaparte, relating to the Indian population, have already been called in

question. The few typographical blunders are, of course, very conspicuous in pages so handsomely printed; and the general atmosphere of the work is, perhaps, a trifle too optimistic, though even a sober-minded German savant could scarcely escape a little enthusiasm over the wonderful progress of Mexico in the past quarter of a century. The lack of an index, as in so many French books, is regrettable.

Among the sections of special interest to the geographer are E. Reclus's description of the physical geography (45 pp.); Prince R. Bonaparte's section on the population and colonization of the country, including the emigration movements that led thousands of Mexicans far afield to the Philippines, Florida, Cuba, and California (69 pp.); Gomot on Agriculture (67 pp.); de Launay on the metals and the mining industry (61 pp.); Picard on industry, trade, and navigation (71 pp.); Krantz on railroads and public works (58 pp.); and Lagrave on the post and telegraph services (25 pp.). The political institutions, public finances, monetary and banking systems, education, position of Mexico in science, art, and literature, the army and navy and exterior relations are treated by equally authoritative writers.

There are numerous excellent small maps of the ports, and the larger coloured maps illustrate the distribution of agricultural products and minerals, the physical and political features, and the railroad system. The especially interesting railroad now rebuilt across the Isthmus of Tehuantepec is shown on a sufficiently large scale. Prof. Levasseur, the editor, acutely and eloquently sums up the whole work (45 pp.), and also contributes a short historical review of the country.

Diccionario Sipibo. Castellano–Deutsch–Sipibo. Apuntes de Gramatica. Sipibo–Castellano. Abdruck der Handschrift eines Franciskaners mit Beiträgen zur Kenntniss der Pano-Stämme am Ucayali herausgegeben von Karl von den Steinen. Berlin, 1904. Dietrich Reimer (Ernst Vohsen).

The well-known ethnologist Professor Dr. Karl von den Steinen, one of the directors of the Royal Museum of Ethnology in Berlin, has published under the above title a MS. ascribed to an unknown Franciscan monk, giving a vocabulary of Spanish and Sipibo (Pano), probably, according to the editor, of about the year 1877; another vocabulary, Sipibo and Spanish, from 1810 to 1812; and, lastly, an addition to the second. The former also contains, at the end, a number of grammatical notes. The learned editor introduces these publications (of hitherto as good as unknown manuscript) by a bibliography, and a short discussion of pictographs on cotton-cloth, reported (from hearsay) to have been met with among the Pano in the second half of the eighteenth century. Thereupon follows an historical sketch of the Panos from the seventeenth century on, a list of the Pano tribes in Peru, Bolivia, and Brazil, and notes on the vocabularies. The part relative to supposed picture-writings of the Panos (about which Humboldt wrote in very cautious terms) may be dismissed with the remark that, since they were on pieces of cotton-cloth tied with agave fibre, it is not impossible they may have belonged to the class already made by Indians in the latter half of the sixteenth century, and still used by them to-day in Bolivia—for memorizing parts of the catechism, for instance. That the pieces of cloth contained human and animal figures, together with "isolated characters, that were taken for hieroglyphics," at Lima, and painted "in lines with wonderful order and symmetry," also recalls (the "wonderful" part excepted) these Indian substitutes for writing. There are, in the Beni region to-day, aged Indians who remember Latin prayers taught their forefathers in the now long-abandoned missions.

For Dr. von den Steinen, the history of the Panos begins in the middle of the

seventeenth century. The numerous expeditions down the Napo and the Amazon since 1538 have left us (so far as documents show) no local or tribal name that might lead to the inference that any branch of the Panos had been touched by these expeditions, and yet it is almost impossible that Orellana, in 1542, should not have come in contact with one or the other branch of them. The same may be at least supposed of the expedition of Pedro de Ursúa (in 1560), and it would not have been superfluous to mention such possibilities, as well as the expeditions made by Juan de Salinas Loyola between 1570 and 1577. In addition to these, George Hormuth of Speyer, and especially Philip von Hutten, penetrated, as Governors or administrators of the German colonial and commercial plant in Venezuela—the first as far as the Uaupés, the latter to the Omaguas. While there is hardly any positive evidence, as yet, that these expeditions came in contact with the Pano tribes, they grazed the ranges thereof so closely that it might have been well to mention them.

It is to be regretted, also, that the Professor has not given in his chapter or section dedicated to the list of Pano tribes in Peru, Bolivia, and Brazil a clearer *aperçu* of the present distribution of the Panos. This may be in part deduced from the notices taken by him from various sources, but it would have been better to state, in a few introductory lines, the actual range of the linguistic stock in general. This could easily be done by means of the Raimondi Atlas of Peru (which, by the way, Dr. von den Steinen absolutely ignores in the cartographic part of his bibliography). Plates 3, 4, 8, 9, 13, and 17 of that atlas indicate the approximate location (close circumscription is never possible with unsettled Indians) of at least eight of the groups into which the German ethnologist subdivides the Panos.

The linguistic part of the work, the vocabularies proper, is of course very valuable. The first one (Sipibo and Spanish) contains as many as 2,513 words, the second (Spanish and Sipibo) 2,656, most of which, however, are included in the former also. It is a duty to thank Professor von den Steinen for having placed within the reach of linguistic students such an amount of material.

The editor does not seem to have known, when he published all this material, of the existence of another vocabulary, printed at La Paz (Bolivia) in 1898, and due to the efforts of the present Bishop of that city, Don Fray Nicolas Armentia, for many years missionary in the regions of the Beni River. This vocabulary, which includes about 3,800 words (nearly 1,300 more than the first one of Professor von den Steinen, 1,100 more than the second, and 600 more than the two combined), was published in No. 1 of the first volume of the *Boletín de la Sociedad geográfica de La Paz*, and as no reference to it is made in the bibliography, it may not be improper to allude to it here. Its title is (p. 43): "*Vocabulario del Idioma Schipibo, del Ucayali, que es el mismo que el Pacaguara del Beni y Madre de Dios. Este es un dialecto de la lengua Pana, que es la lengua general del Huallaga, del Ucayali y de sus afluentes.*" A brief reference to von Tschudi, *Peru* (1846, Vol. II, p. 221 to 241), in the Bibliography, might not have been amiss. A. F. B.

The Tower of Pelée. New Studies of the Great Volcano of Martinique. By Prof. Angelo Heilprin. 62 pp., 23 photographic plates, and Index. J. B. Lippincott Company, Philadelphia, 1904.

The volume being a quarto gives ample page space for the large and beautiful photographs, taken by Prof. Heilprin, illustrating chiefly the later phenomena associated with the eruptions of Pelé. The letterpress is especially devoted to a discussion of the history and nature of the great tower which for so many months was the centre of interest in the crater of Pelé, but which was doomed to destruction. Its

disappearance seems to have marked the beginning of a new period of activity in the volcano.

It is well known that Prof. Heilprin differs from some other students of the volcano in his views as to the origin of the tower, which, he believes, "was merely the ancient core of the volcano that had been forced from the position of rest in which solidification had left it." The French observers, on the other hand, believe that the tower was an extrusion of solidified new lava—a view to which Prof. Heilprin at first inclined, and this volume gives his reasons for revising his opinion. He makes the point clear that there are still many unsettled questions relating to the mechanism of the eruptions and the accompanying phenomena.

An den Grenzen von China und Tibet. Von H. Hackmann. Halle a S., 1904. Gebauer-Schwetschke, Druckerei und Verlag (m. b. H.).

This pretty little book does not claim to be anything more than the diary of a simple traveller who wishes to share the impressions and experiences of an interesting trip with his fellow-men. But the author, although not a geographer or other scientist, but a missionary returning home from the field of his labours through a country little visited by travellers in order to study some special forms of Buddhism, has made a real contribution to our knowledge of southwestern China. While the regular road from China to Burma goes from Suchou on the Yang-tse south-west toward Yunnan-fu, he traversed a practically unknown region west of that route in the border mountains of China, Tibet, and Burma. In that interesting country the contact of several races on a territory almost secluded from the outside world has produced very peculiar ethnological conditions, and no less complicated geologic problems result from the contact of the Indo-Chinese and Central Asiatic mountain ranges and await the visit of the explorer who shall be able to devote his whole time to their study. For one to whom the geographical part of the trip was only a side issue, the author deserves the gratitude of the geographers for collecting so much that is valuable for their work.

It is especially pleasant to see that the author does not, like many amateur geographers, commit the mistake of considering his own personal experiences and supposed acts of heroism the nucleus of the narrative; it is for the sake of the subject that he speaks to us, and only because he knows that there is at present nobody in possession of newer and better information than he. With the same modesty he excludes from his narrative all remarks on parts of the country visited recently by regular explorers, so that it is most likely to be read with the same interest by the geographer hunting for new information as by the layman who enjoys the charm of a well-written story of travel and adventure.

The route pursued followed the valleys of the Min-kiang and the Ya-ho Rivers, tributaries of the Yang-tse, up to the city of Ya-chou, with a side trip to the holy mountain of Omi, description of which must be reckoned among the gems of geographic literature; from there to the west across the Elephant-Pass to Ta-tshien on the Tung-ho, another tributary of the Yang-tse; down that river south to Tzta-ti and through the Lolo country down the Kien-chang River, then south-west through the country of the Mosso to Tali across the mountains of farthest China, and from there west-southwest *via* Yung-shang and Teng-yüe to Bhamo, where the party struck the regular road again.

The most valuable chapters of the narrative seem to be the reports on those interesting tribes of the Lolo and Mosso, about whom so little is known and with whom, after the natural suspicion against the white man was overcome by means of medical assistance and some presents, the author succeeded in establishing such

friendly relations that the records of his stay among them give a most vivid picture of the character, habits, and primitive civilization of these interesting tribes. The linguistic and religious training of the author makes the ethnological chapters the most scientific parts of the book, while in the descriptions of the landscape the lover of nature and the advocate of the Gospel often betray themselves more than is generally compatible with the character of a scientific report. But then he does not intend to write such a book, and for being less scientific those chapters are no less enjoyable reading. The impromptu experiences and accidents of the trip are recorded with enough good humour to add spice to the narrative, and the perfectly artistic drawings will delight the heart of every lover of the beautiful. The geographer, however, must complain that not a single name is given with any of the illustrations, large or small—an omission the more deplorable because we are told that even the purely decorative designs are authentic copies of originals from the author's collections. In another direction the needs of the scientific reader have been very well considered by the addition of two fairly good maps. As a whole, the book seems well adapted to serve the purpose for which it was written—viz., to create a desire for more information about those interesting out-of-the-way regions and their inhabitants.

M. K. G.

Japan und die Japaner. Von Carl Munzinger. 173 pp. D. Gundert, Stuttgart, 1904. (Price, M.1.50.)

A book of much literary merit, which claims attention for the ability with which it is written and for the philosophic method which it applies to Japanese problems. The writer, for example, does not merely state the fact that Japanese children are as mannerly and, perhaps, better behaved than those of the Occident, though they are almost never punished; he seeks to show that they are under influences from their earliest infancy tending to make them obedient and respectful, without recourse to the barbarity of corporal punishment. So, throughout his book, he seeks the inner meaning of the phenomena he describes; the geographical conditions and the historical events that have been most impressed upon them; the modern state evolved from Old Japan; the character and soul of the people, and what their religions, their schools, and culture mean to them. It is a book well worthy of an English rendering.

Die Japaner und ihre wirtschaftliche Entwickelung. Von Karl Rathgen. vii und 149 Ss. B. G. Teubner, Leipzig, 1905. (Price, M. 1.25.)

This is one of the series "Aus Natur und Geisteswelt," a collection of small volumes, devoted to the exposition in simple language of many features of human development. Professor Rathgen had the advantage, in writing of the Japanese and their economic development, of having lived for years in their country, and this is his third book relating to the island empire. The volume is a simple and admirable summary of the history, character, and economic conditions of the Japanese, treating of the land and the people, their Government, money and banking, the national finances, and Japan's place in the world's trade. The book concludes with tables of Governmental and trade statistics for a series of years. The bibliography at the head of each chapter is a desirable feature.

Nutzbare Tiere Ostasiens. Pelz und Jagdtiere, Haustiere, Seetiere. Von Emil Brass. viii und 130 Ss. J. Neumann, Neudamm, 1904. (Price, M. 5.)

Mr. Brass was for twelve years engaged in the skin export trade of Eastern Asia. During this time he travelled extensively to enlarge his knowledge of the skin and

fur animals, and collected a great deal of first-hand material for his book. The volume is a compact and well-arranged account of a large number of the wild and domestic animals of the Chinese Empire, Korea, Japan, and eastern Siberia, and of the whaleries and fisheries of the North Pacific. It is a good study in natural history and in the economic aspects of the animal kingdom of Eastern Asia.

A few of these animals are more or less dangerous to mankind, and among them the Amoy tiger, resembling in size and habits the Bengal tiger, appears to be most important. In the neighbourhood of Swatau and Amoy, especially, this tiger kills and carries off many Chinese every year. Missionaries who frequent the cool summer resort Kuliang, not far from Fuchau, tell of a tiger which invaded the town and carried off a woman. Missionaries in a place about thirty miles from Fuchau organized a tiger hunt a few years ago, and sport-loving Europeans from as far away as Shanghai participated. The hunt was arranged for the purpose of ridding the district of at least a part of the animals that had been killing from 200 to 300 human beings in a year. In the peninsula of Kowloon, opposite Hong Kong, these animals are feared because they prey on men.

As a rule, however, the tigers prefer wild and domestic animals, and give men a wide berth. Mr. Brass says that most of the so-called "man-eaters" are old and enfeebled and no longer able to hunt wild beasts. Driven by hunger, they attack man, and soon acquire the habit of preying upon him exclusively until their career is stopped by a bullet or a trap.

Vorläufiger Bericht über eine Archäologische Expedition nach Kleinasien. Von J. Jüthner, F. Knoll, K. Patsch, H. Swoboda. 52 pp. and 2 maps. (*Mitt.* No. 15 der Ges. z. Förder. Deutscher Wissenschaft, Kunst u. Literatur in Böhmen.)

The German-Bohemian Society that sent this expedition to Asia Minor was fortunate in its selection of leader and members of the party. The field was to the west and southwest of Konia in south-central Anatolia, an almost virgin field, as only one explorer, the American, Sterrett, had visited it within the past fifty years. Mr. Patsch, who writes the present report, says that a large part of this region (Isauria) is a desert and poverty-stricken land, though it contains many well-preserved evidences that in ancient times it was the home of a flourishing and cultured people. The sites of a large number of ancient towns were established and over 300 new inscriptions were copied. Among the numerous phases of the work was the complete survey of the magnificently-preserved ruins of Zengibar-Kalesi, near the present Isaura. A number of photographs show the excellent quality of many of the old buildings, with which the present constructions in the same region contrast very unfavourably. The preliminary report will increase the desire to read the full account of this important work.

L'Indo-Chine française. (Souvenirs.) Par Paul Doumer. xvi and 392 pp., 12 Plates, about 150 other Illustrations, 9 Maps in Text, and 1 coloured map. Vuibert et Nony, Paris, 1905. (Price, fr. 10.)

Mr. Paul Doumer was Governor-General of French Indo-China from 1897 to 1902. During these five years he found opportunity to travel extensively in each of the five provinces. Some of these long journeys were made without escort, and almost alone, and in this way he traversed on horseback some of the least-known parts of the colony. His book, which is handsomely printed and illustrated, is not so much a record of these travels as of the impressions and the information he derived from them.

He takes each province in turn, and emphasizes the characteristics that distinguish the region and its people. Such a book cannot be exhaustive, but it may be very instructive when written by a man who, like Mr. Doumer, is an acute observer and has had unusual opportunities for seeing and studying.

Some towns of the East rival one another in trade just as they do in the Occident:

> The mother-of-pearl inlayers live almost entirely in Hanoi and Nam-Dinh, the capitals of Tonkin. There is a difference in their products, the inlaid work of Hanoi being done with much smaller pieces of shell, producing, many think, a finer effect and requiring more labour. But not a few discerning persons prefer the work of Nam-Dinh, though Hanoi has its numerous champions. There is similar rivalry between the embroideries of Hanoi and those of Bach-Ninh. Though the industry is mainly centred in the capital, Bach-Ninh has the advantage of being the home of a celebrated artist in this line, who draws to his large establishment much business from other towns.

On his journey to the colony the author wrote a description of the French-African port of Jibuti (pp. 13–14), which is welcome.

Die Baumwolle nach Geschichte, Anbau, Verarbeitung und Handel, sowie nach ihrer Stellung im Volksleben und in der Staatswirtschaft. Im Auftrage und mit Unterstützung der Bremer Baumwollbörse bearbeitet von Prof. Dr. A. Oppel in Bremen. Mit 236 Karten und Abbildungen. Leipzig, Verlag von Duncker & Humblot, 1902.

This extensive and scholarly monograph on the cotton plant, published by the author for the Bremen Cotton Exchange and with the aid of that body, appears as one of the most valuable books of information about this important plant and its industries. It is divided into two parts—a general and a more specially geographic one. The former presents in a systematic way the history, cultivation, manufacture, and trade relations of cotton and its ethnographic and economic importance; the latter contains the regional treatment of the countries which produce cotton or cotton goods, their climates, soils, ways and means of cultivation, manufactures, etc.

The earliest mention of the cotton plant comes from India, from which country it spread to the nearer Orient, Egypt, Greece, Rome, and Spain. In China it does not seem to have been known even in Marco Polo's time; and in Japan, although an attempt was made to introduce it as early as 800 A.D., it never amounted to anything before the re-introduction by the Portuguese about 1600. In the reports of Sir John Mandeville and his contemporaries it appears as the "plant sheep," a fabulous Oriental animal growing on a shrub or tree.

The earliest cotton manufacturing among Occidental people was found at Ulm, Germany, about 1320, and during the next three centuries that industry developed so much in various parts of Germany that even England got her supply of cotton goods from that country. The Thirty Years' War proved a deadly blow to this industry as to many others, and when the importation into England of cotton grown in her American colonies began, the foundation for the English supremacy was laid. The earliest attempts at growing cotton in America are recorded from Virginia (1621), from South Carolina (1666), from Louisiana (1697), and the first cotton was exported from Georgia by one S. Augsburger, a Swiss colonist, in 1739. The leadership of America in the production and export of cotton, however, dates from Eli Whitney's invention of the sawgin (1794), in consequence of which the production of cotton rose from two to forty million pounds during the decade of 1791–1801. At present the United States produce two-thirds of the world's cotton supply, with India, Egypt, and Turkestan as the next important producers. In manufacturing, England took the lead after the decline of the early German industries, which were carried to

Britain by the immigration of fugitive Protestant weavers from Germany, and further developed by the introduction of the mechanical processes of manufacturing. Most draconic laws were passed to prevent the communication of any information concerning spinning and weaving machines to continental Europe. Capital punishment for exporting machines was abolished only in the nineteenth century, and it needed the boycott on English goods imposed by Napoleon and the betrayal of English methods by forty English cotton workers who escaped from that country to re-awaken the German industries and to start new ones in the other parts of Europe. In the United States the first spinning machine was set up at Beverly, Mass., in 1787.

Of the almost innumerable species and varieties of cotton, five types are most generally recognized: (a) Sea Island (*gossypium barbadense*); (b) Kidney cotton (*G. peruvianum*), to which the Brazil and "rough Peruvian" belong; (c) American Upland (*G. hirsutum*); (d) Indian (*G. herbaceum*); (e) African (*G. arboreum*); each of which is adapted to certain climatic conditions and certain soils. On the whole, a warm and sunny climate, with plenty of moisture, except during the ripening of the fruit, and a light bottom soil are the prime requirements for the plant. It does not occur farther north than 37°, and cannot stand frosts. Therefore it must be sown fresh every year in the United States; while in Mexico and other more southerly climates a plant lives through several years, occasionally up to as many as fifteen. The maximum area under cultivation at one time in the United States was 25 million acres (1/6 of the arable land), in India 18, in Egypt 1.8 million acres. Under present conditions the average revenue derived from cotton-growing will give the farmer a comfortable income, but will not make him rich. Aside from the fibre itself important industries have been started in utilizing the seeds, mostly for oil (in 1881, 90% of the oil sold as olive oil was found to be cotton oil); also for fertilizer, as food for cattle, and for medicinal purposes. The fabrication of wadding, gun cotton, collodion, and celluloid furnish important by-products.

The ethnological value of cotton rests mostly, of course, on its use for garments among the primitive as well as the most civilized nations: a curious instance being reported from a Sudan tribe who clothe their warriors and horses in an armour of cotton wadding. It is also important as a means of subsistence for one hundredth of the world's population, furnishing employment to approximately fifteen million people; and in Tibet, the Sudan, and on the Senegal River pieces and rolls of cotton are used as barter, with a fixed monetary value.

The greatest social change brought about by cotton manufacturing is the rise of the factory system, which was first applied in this industry, with all its good and evil consequences. The destruction of home industries and historical costumes by the production of an abundance of cheap, uniform dry goods, the lowering of the standard of life of a formerly rural and half-rural population by crowding them together in factories, the narrowing of their horizon by giving a whole town only one kind of employment for almost all its people, the widening of the gulf between the rich and the poor by dividing the population into capitalists and wage-earners, to the almost complete extinction of the middle classes, the evils of women and child labour—all these were first felt in consequence of the phenomenal development of the cotton industry. It is comforting to learn that in England, its oldest home, it has outgrown some of the evils attending it, and that to a great extent the cotton-workers of the great industrial centres of that country are the most prosperous, healthy, and self-respecting set of people that can be found in any industry.

Economically, almost all countries have derived and are still deriving a large part of their income from the taxes on imported cotton.

In the special geographical part of the book the United States are naturally given the most prominent place. During the last century the output of cotton in this country multiplied 145-fold, and it is still far from the limit of its possibilities. Even a moderate estimate promises fifty million bales per annum if all the available land were under cultivation. Texas alone, the youngest and already largest cotton State, could produce all of the present output of the whole country. Even the methods of cultivation are not everywhere up to date. It was not until after the Civil War that any fertilizer was used at all; even then it was often used in a haphazard way, which did more harm than good, and only through the efforts of the Government experiment stations have more rational methods been adopted in recent years.

While formerly the South produced only for exportation to the North or abroad, it now has a young and promising industry which already manufactures one-fourth of American cotton goods. England has materially decreased in the last decades as a consumer of American cotton—from 66% of the American exports which it bought in 1870, it had gone back to only 39% in 1900. The Pacific ports have received a good customer in Japan; but she may soon have enough of Indian and home supply not to need any more American raw material.

India, the cotton country next to America in importance, is both a producer and a manufacturer and exporter of cotton, with Bombay as its industrial centre and chief port. The factories, which were started with English workmen, are now filled almost exclusively with natives. The industry is largely handicapped by bad roads; the harvest, by Hindu holidays, which often coincide with the height of the harvesting season. In spite of that, India possessed, in 1900, 186 factories, with 4.7 million spindles and 38,420 mechanical looms. The old Indian home industries have been almost entirely supplanted by the work of the mechanical loom.

Of the other Asiatic countries Persia, and especially Turkestan, promise to become powerful rivals of this country in the production of raw material, through the attention paid and the encouragement and material aid given to the cultivation of the plant by the Russian Government. A constant increase of the number of good roads, low railroad rates, financial aid to the poor planters, and the work of an experiment station established in imitation of those of the United States, have already enabled Russia to grow almost all of its own cotton, and European Russia has conquered the former place of France in the list of the world's cotton-manufacturing states—England, United States, Germany, Russia, France.

In China and Japan cotton has supplanted silk to a great extent; some is grown at home, the larger part imported, mostly from India. In South America, Peru and Brazil show an encouraging outlook; in North America, Mexico has made a good start, both in growing and in manufacturing cotton, and in Canada a considerable industry has lately sprung up.

In Europe, England leads in the production of cotton goods and in the condition of its cotton-workers. In the last decades Germany has become her most powerful rival, and Switzerland and France excel in the finest cotton fabrics, which, in the former country, are to a large extent still made by hand.

As a book of reference, this volume certainly has no equal in the market. There are some repetitions, of course, as certain chapters are likely to overlap in a book of that size. A large supply of good illustrations and maps, many of them original, a very complete bibliography, and an alphabetical index greatly add to its usefulness.

M. K. G.

XUM

Der Suezkanal. Seine Geschichte, seine Bau- und Verkehrs-Verhältnisse und seine militärische Bedeutung. Von Albert Ungard, Edler von Öthalom. viii and 104 pp. and 6 maps in colours. A. Hartleben, Vienna, 1905. (Price, M. 4.)

The author remarks in his preface that, hitherto, no German handbook has been prepared treating exhaustively of the various conditions that brought the Suez Canal into existence. This book affords a systematic and thorough treatment of the whole great enterprise, beginning with the history of the old canal that was actually in operation many centuries before the Christian era. The political and financial preliminaries to the building of the present canal, the geology and topography of the Isthmus of Suez, the canal construction and the development of the ports, the Sweet Water Canal, the transit conditions, the economic and military significance of the work, and the international and maritime questions involved are all fully described and discussed. The maps are excellent, and will rank among the best for general use. The book is a scientific as well as a popular description of all phases of the Suez Canal.

Les Chemins de Fer coloniaux en Afrique. Par E. de Renty. Première Partie : Chemins de Fer des Colonies Allemandes, Italiennes et Portugaises. viii and 154 pp. and 8 sketch maps. F. R. de Rudeval, Paris, 1903. (Price, fr. 1.50.)

Deuxième Partie: Chemins de Fer dans les Colonies Anglaises et au Congo Belge. 337 pp. and 9 sketch maps. 1904. (Price, fr. 3.50.)

Troisième Partie: Chemins de Fer dans les Colonies Françaises. (To appear.)

The main ideas upon which these volumes are based are (1) that Africa is rich in a great variety of resources that, if properly developed, will enrich the colonial Powers which divide the continent among them; and (2) that the railroad is certain to be the most powerful agent in this development. The author, Captain de Renty, of the French army, also emphasizes the idea that the benefits to be derived by the colonial Powers from the development of their possessions will consist as much in the creation of new needs among the populous native tribes, thereby opening new markets for European manufactures, as in the exploitation of the natural resources of the colonies.

These ideas are well founded, according to the testimony of the leading authorities on Africa; and upon them as the groundwork of his studies the author has given, in the first two volumes of his series, a careful and able treatment of the economic conditions in those parts of Africa under consideration, as well as the history of the remarkable railroad enterprises now in progress.

Captain de Renty treats in turn the colonies of each of the Powers, beginning with the German possession of Togo. Does the climate of Togo, for example, adapt it for European colonization, or must it remain a colony of commerce and plantations? Is the seaboard favourable for the development of ports? Are the rivers adapted for commerce; what are the present trade routes; can horses and cattle thrive, or is man the only means of transport? About what is the density of population; what are the commercial resources, and the amount of the import and export trade; what is being done for general development, either by Governmental or private enterprise? Upon such broad foundations as these the author gives the history of the railroad enterprises, in progress or projected, in each of the colonies, with comments or criticisms of his own and many citations of the views and policies of Governments and of the opinions of leading men.

At the end of most of the colony chapters the author gives the conclusions he has reached from the facts collated and a list of the works he has consulted. He thinks that the very tardy development of railroads in German East Africa is a mistake, inasmuch as the superior enterprise of the Congo State in the west and of the British colonies in the north and southwest are already providing outlets for the products of the German colony; that Italy is wisely planning to complete the mastery of her small possessions by means of the railroad and locomotive; that Portugal has not yet proved her ability to give to her rich territories the intensive and rapid development required by the necessities of modern economic life; and that the broad and energetic railroad policy of the Congo State bids fair to hasten the organization, in an admirable manner, of all its material interests, and make the territory of vast importance to Belgium. The author has only words of praise for the far-sighted railroad policy of the British and the rapidity with which they are carrying it into effect.

Captain de Renty is the first writer to treat this great phase of African development with fulness and adequate grasp. His book fills a need in African literature, and the concluding volume will be awaited with interest.

Tales from Old Fiji. By Lorimer Fison. xlv and 175 pp., 22 Illustrations, Appendix, and Index. Alexander Moring, Ltd., The De La More Press, London, 1904. (Price, 7s. 6d.)

This collection of Fijian legends, most of them narrated to the author by Taliai-tupou, the King of Lakemba in the eastern group of the Fijis, is interesting reading, and worthy of record as a contribution to our knowledge of a vanishing people. It includes twelve stories, an introduction in which the writer throws light upon the characteristics of the Fijians by an examination of many words in their language, and an appendix descriptive of some of their customs and arts. He selects a considerable number from the large class of old Fijian words that are innocent in themselves but contain an evil secondary meaning, and thus adduces strong evidence that the old Fijian heathen, in spite of his pleasing exterior of which explorers wrote, was as debased and brutal a savage as can be imagined. "Thotho," for example, means the dried grass that is strewn on house-floors, but its other meaning is the women who were strangled and then buried in a chief's grave. Such words show that the introduction of Christianity had a humanizing influence, and led to the abolition of abhorrent practices.

Doubts have been expressed as to the authenticity of statements concerning Fijian cannibalism, but the author says that many words more than substantiate the most revolting accounts that have been published; and some of the words seem to bear out the theory that cannibalism in the islands arose from the strongest motive, and that is hunger. Many legends are good stories as well as valuable for ethnological material. If the schoolmaster had not reached Tonga, no doubt its legend (here included) as to the origin of Napoleon would have become veracious history handed down from the fathers. According to this story Napoleon was the son of a Tonga mother, with whom he was living in Merikei (America), when the men of Faranise (France) came seeking him to save them from their enemy Uelingtoni (Wellington):

> I could tell you of his mighty deeds—how he smote the enemies of Faranise, though they were many and strong; how he chased Uelingtoni from land to land, till he caught him at Uatalu, and banished him to a desert island, where he died.

XUM